

Dental

Abstracts

a selection of world dental literature

AMERICAN DENTAL ASSOCIATION

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AMERICAN DENTAL ASSOCIATION

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**Dental
Abstracts
has
these
purposes**

1. *To present a selection of pertinent literature representative of all points of view within the profession;*
2. *To provide, by a few hours' reading each month, a survey of the significant advances being made by dentistry throughout the world, as reflected in current dental literature; and*
3. *To supply enough data in each abstract so that the reader may determine whether he wishes to refer to the original article for more complete information.*

The abstracts are grouped in broad classifications. The specialist will learn from this periodical of work done in other fields as well as in his own. The general practitioner will be able to keep abreast of modern knowledge in the various specialties. Articles from which abstracts have been made are on file in the Library of the American Dental Association and may be borrowed by members of the Association. Requests for articles should be addressed to the Bureau of Library and Indexing Service, American Dental Association, 222 East Superior Street, Chicago 11, Illinois. Only three articles may be borrowed at one time, and they may not be kept longer than one week. No charge is made to Association members for this service.

Operative dentistry

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Inlays and fillings**Preparation of proximal cavities:
a new technic (Eine neue Technik
zur Präparation von Approximalflächen-
Kavitäten)**

Harald Reich. *Deut.zahnärztl.Zschr.* 11:873-874
Aug. 1, 1956

The often difficult task of beginning the preparation of proximal cavities in bicuspids and molars, especially if the decay has started at a considerable distance below the contact point, can be simplified by the use of a new technic.

The occlusal grooves and marginal ridges are cut with a specially constructed proximal dia-

This procedure fulfills Black's demand for "extension for prevention," and at the same time preserves adequately the tooth substance.

The incisal angle, about 30 degrees, complies with the prescription for an ideal inlay filling.

The proximal diamond wheel eliminates the disadvantages of the "slice cut technic," which permits only two alternatives: either sharp pointed cavity edges or extensive loss of substance.

The cutting should be done with a carborundum stone. The proximal lingual wall can be cut down to a point below the free gingival margin with a straight chisel. The proximolinguoincisor angle should be well rounded.

In cutting across the incisal angle, the stone should be held in such a manner that the lingual enamel surface can be reduced more than the labial enamel surface. Because of the stress exerted on the tooth, and the shape and the thickness of the labial and lingual enamel surfaces, it is not possible to say dogmatically how much of the lingual surface can be or should be removed in each individual instance. As a general rule,

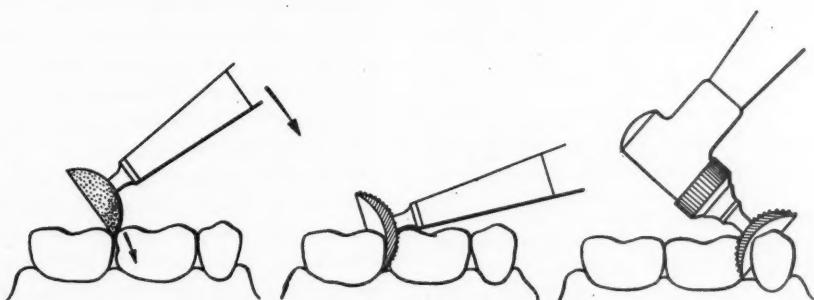


Figure 1 Preparation of a proximal cavity in a molar. Left: Beginning. Center: Cutting of occlusal grooves and marginal edges. Right: Finishing the enamel walls

mond wheel which has a diameter of from 4 to 5 mm. The cutting, however, should not reach below the dentinoenamel border. A hole, 1 mm. or less, is bored with a spear-shaped drill. This hole runs from the occlusal surface to the gingival edge of the cavity to be prepared. The hole should begin at the dentinoenamel junction of the reduced marginal ridge; the proximal enamel surface may serve as a guide to protect the adjoining teeth.

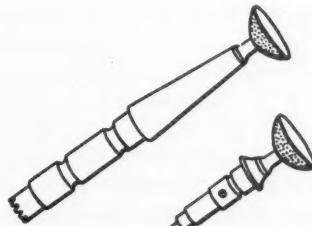


Figure 2 Proximal diamond wheels

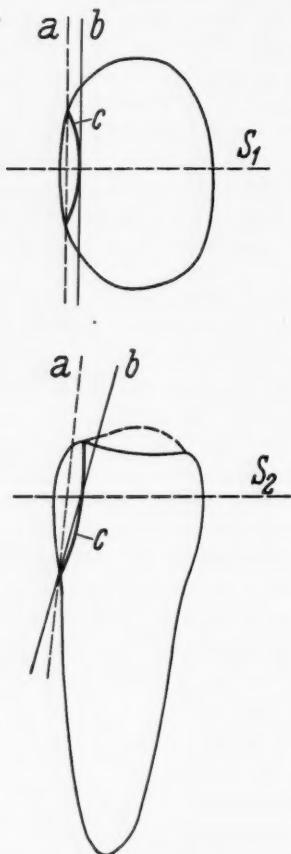


Figure 3 Preparation of a proximal cavity in a bicuspid (a = cutting plane when a customary wheel is used; c = cutting plane when the proximal diamond wheel is used; S_1 and S_2 = average cutting level). Above: Transversal cut through the crown. Below: Axial cut through the crown

however, at least twice as much can be removed from the lingual surface as from the labial surface.

After the lingual surface has been reduced with the proximal diamond wheel, the enamel is undermined with a small fissure bur, then removed with the chisel to effect the "incisal step."

This new method of preparing a proximal cavity has the following advantages: (1) saving of time in preparation of difficult proximal cavities; (2) maximum protection of the pulp, the adjacent teeth, and also protection against recurrent caries; (3) minimum removal of healthy tissue, and (4) permanence of inlays or fillings which cannot be dislodged by functional stress.

Sharp instruments and new burs and handpieces are absolutely essential to reduce the time needed to prepare properly a proximal cavity and to minimize the patient's pain. All instruments and implements must be within easy reach, and as much as possible should be accomplished with each instrument used before a change of instruments is made.

Modifications of this technic will be necessary at times, but none of the fundamental principles of proximal cavity preparation can be violated because every departure from these principles invites failure. When these fundamentals are applied properly, and the new technic is used to simplify difficult preparations, success will be assured.

Tooth fillings (Füllungen)

V. Schwenk. *Österr.Zschr.Stomat.* 52:662
Dec. 1955

By using a quick hardening phosphate cement in a dense consistency for fillings and linings of cavities, a desirable thermal isolation can be obtained which leads to a significant improvement in the properties of both silver and copper amalgam.

Sometimes, however, minute parts of the phosphate elements are mingled with the amalgam during mixing. These foreign bodies can influence unfavorably the metal structure of the filling material, reduce its homogeneity, change significantly its setting time and disturb its stability.

When the tooth fillings are isolated adequately with layers of dental cement, such unfavorable changes are minimized, the harmful effects on the structures of enamel and dentin are reduced and discoloration of the teeth is avoided.

If a quick hardening phosphate cement which sets in a dense consistency before insertion is used for lining purposes, the phosphate elements cannot blend with the amalgam.

Small amounts of properly proportioned and amalgamated alloy are squeezed and fed into the cavity forcefully with small instruments. Then all the cavity walls are covered gradually.

By the use of this method under favorable circumstances, including adequate oral hygiene, amalgam fillings will give many years of satisfactory service.

**Pulp reaction
to ultrasonic cavity preparation**

Harry J. Healey, Samuel S. Patterson
and Grant Van Huysen. *U.S. Armed Forces M.J.*
7:685-692 May 1956

Twelve noncarious maxillary and mandibular bicuspids which were scheduled for removal for orthodontic purposes had cavities prepared in them. Either a steel bur, a diamond stone or an ultrasonic dental instrument was used. The steel burs and diamond stones were operated under a stream of water. The cutting of the tooth with the ultrasonic instrument was accomplished with a blunt steel tool having a working surface $\frac{1}{16}$ inch square, and operating at 29,000 vibrations per second in an aqueous slurry of aluminum oxide.

The teeth were then restored with a calcium hydroxide base covered with zinc oxyphosphate cement or amalgam restoration. In the postoperative period no pain or temporary hypersensitivity was observed in any of the teeth. One to two months after being prepared and restored, the teeth were extracted under local anesthesia. The teeth were placed in 10 per cent Formalin after the roots were amputated. The histologic appearance of the pulps was compared.

No unfavorable pulpal reaction resulted from the use of an ultrasonic cutting instrument in preparing cavities in the teeth used in this study. The reactions of the pulp to the use of the steel bur, the diamond stone and the ultrasonic instrument were strikingly similar.

**Hazards of dental fillings
under local analgesia**

Brit.M.J. No.4980:1440 June 16, 1956

Q.—What are the dangers and possible complications of multiple amalgam fillings under local nerve block? Can trigeminal neuralgia and pulp damage occur?

A.—There is no doubt that the use of local analgesia in the preparation of a carious cavity in a tooth for a filling involves the additional risk of damage to the dental pulp. Once a local analgesic has been given, the operator is denied one of the most valuable clinical guides to the condition of

the pulp—namely, the response of pain—and he must therefore decide before he gives the analgesic whether the pulp is in a vital and healthy condition. The pulp may be damaged by the actual process of cutting, or by the heat produced by a revolving bur. The former is avoided by careful operating and the latter by a slow and intermittent cutting or by cutting under a constant stream of cold water.

The advantages of local analgesia for cavity preparation, both for patient and operator, are so obvious that students are taught to use it where necessary but to be aware of and avoid the dangers.

These dangers are increased where multiple amalgam fillings are done under local nerve block, because of the temptation to cut faster. If due precautions are taken, however, particularly cutting under a stream of cold water, and if all cavities are lined with a nonirritating, heat resisting cement, no trouble should arise.

Toothache or facial neuralgia following fillings may be due to a minute, undetected exposure of the pulp, but is most likely to be due to overheating. The term trigeminal neuralgia is usually reserved for a very severe form of neuralgia of which the cause is not known.

**A new standard for the buccolingual
preventive extension of approximal cavities**

Takao Fusayama. *Bul.Tokyo M.D.Univ.*
2:251-255 Jan. 1956

Although it is desirable that a definite standard be set for determining the necessary limits of the buccolingual preventive extension of proximal cavities, no such standard exists. In this study the typical proximal unclean areas of teeth were indicated experimentally and compared with the forms of natural caries in the extracted teeth. A new standard of buccolingual preventive extension of proximal cavities, believed to be applicable universally, is proposed.

Extracted human teeth were placed on gypsum models of upper and lower jaws. The gypsum gingival margins were cut to indicate a medium recession of the gingiva. China ink was mixed with starch paste and painted over all surfaces

of the teeth and then removed by the author's tongue as much as possible. The teeth were extracted from the models and the unclean areas indicated by the china ink remaining on the proximal surfaces.

The unclean areas of anterior teeth were triangular with the top on the contact points and the base in the gingival area, just as described by G. V. Black. The unclean areas of molars, however, were trapezoidal instead of triangular, as the contact points had some buccolingual width. The shapes of unclean areas of bicuspids were between triangular and trapezoidal.

The experimentally indicated forms of the unclean areas corresponded closely with the general forms of the natural proximal decay.

The buccolingual width of the proximal unclean areas is largest on the buccolingually widest part of the tooth crown and becomes narrower toward the contact point.

A new standard of a 60 degree opening angle for the buccolingual preventive extension of proximal cavities is proposed.

Clinical, bacteriologic and histologic examinations of indirect pulp capping
(Klinische, bakteriologische und histologische Untersuchungen bei der indirekten Pulpenüberkappung)

Josef Kluczka. *Zahnärztl. Welt & Reform*
11/57:11-15 April 10, 1956

Authors differ as to whether it is permissible to leave traces of carious dentin in prepared cavities. In principle, all carious tissues should be eliminated radically. Only in borderline instances (when there is deep-seated caries without symptoms of pulpitis or when the dentist fears that customary cavity preparation can lead to an undesirable opening of the pulp chamber) is it justified to leave traces of carious but not softened dentin in the prepared cavities. Subsequent observations, however, are necessary to make sure that no unfavorable aftereffects occur.

Heavy pressure during the final filling should be avoided. The patient's age should be considered because older patients have less ability to recover than younger patients, especially from

trauma in the region of the pulp. The patient's general health, the site of the carious lesions and the condition of the masticatory organs are important in pulp capping. In instances of progressive apical periodontitis, indirect pulp capping is contraindicated.

At least temporarily, in instances of acute ulcerative gingivitis or stomatitis, especially when accompanied by acute infection of the nose, larynx and bronchi or by nervous disturbances, treatment with a calcium preparation or zinc oxide (with oil of cloves) is preferred to indirect pulp capping.

In spite of the often claimed results that the pulp can be kept vital by indirect pulp capping, this method should still be regarded as being in the experimental stage.



Rehabilitation

Treatment of arthropathies of the temporomandibular joints
(Beitrag zur Behandlung der Arthropathien der Kiefergelenke)

Hartmut Fitzner. *Deut. Stomat.* 6:197-201
April 1956

In instances of arthropathies of the temporomandibular joints, especially if the occlusion is almost normal and if the gaps between the teeth are not too large, injection therapy is indicated. Before such treatment is attempted, however, it is essential to ascertain roentgenographically whether significant alterations have taken place in the involved region. If severe anomalies in tooth formation are present or several teeth have been lost, prosthetic and orthodontic procedures are necessary to free the temporomandibular joints from stress.

In early stages, orthodontic closure of gaps will be sufficient to eliminate undue stress; in advanced stages, the temporomandibular joints must be shortened surgically and the bite raised by orthodontic treatment.

The customary orthodontic treatment to correct this condition with activators seems to be an unsafe procedure, because the patient usually is unwilling to wear the apparatus constantly. Bite raising by insertion of crowns in the posterior region should be undertaken only when a favorable prognosis can be made. Such a prognosis, however, is not reliable when made at the onset of the disease; therefore, as a "test method," metal splints should be inserted into the temporomandibular joints to determine whether a considerable exudation of fluid exists. If this test reveals a favorable condition, the splints can be removed, and the final correction of the bite by the insertion of crowns undertaken.

▼

Miscellaneous

Treatment of intraalveolar fractures in permanent teeth: report of case
(Intraalveolare Frakturen der bleibenden Zähne und deren Behandlung)

Paul Bruszt, Baja, Hungary. *Schweiz. Mschr. Zahnhk.* 65:1103-1110 Nov. 1955

Loss of tooth structure frequently results from fractures. Because of their position in the dental arches, anterior teeth are more often involved in fractures, especially those resulting from accidents.

Fractures may be coronal or radicular. When a coronal part of the tooth is fractured, usually one of the incisal angles is involved, and the line of fracture runs from the incisal edge toward the gingivae. In all such instances, the first consideration (from the restorative standpoint) is to determine whether the pulp is injured. When no pulp injury or exposure is found, the vitality of the pulp should be investigated. The blow which caused the fracture usually produces an inflammation of the periodontal membrane, and it will be necessary to relieve occlusal or lingual contacts by grinding to obtain relief from pressure. Exposed dentin should be protected by temporary procedures, and the fractured tooth should

be kept under observation for from one to three years, sufficient to assure re-establishment of normal condition in the pulp and in the investing tissue.

If a partial coronal fracture has exposed the pulp, the coronal part should be removed (under asepsis) and the root canal treated and filled. This procedure is preferable to pulp capping.

When the fracture extends below the cementoenamel junction and involves parts of the root but does not extend too far in an apical direction, the tooth still can be preserved.

Radicular fractures often occur without the patient's awareness. When a root is fractured, roentgenograms will disclose the presence and position of the fracture. Such fractures do not always necessitate extractions. The nearer the fracture is to the root apex the more favorable is the prognosis for preservation of the tooth.

Fractured teeth not exposed to saliva and capable of being immobilized often heal normally and are able to function. Besides immobilization and lack of infection, it is necessary to keep the two parts in close apposition to promote healing. In teeth in which such healing occurs it will be revealed roentgenographically whether the portion of the pulp extending toward the crown has been altered or replaced, and whether the space has been filled with bonelike structures.

In the case reported, the patient, a 40 year old man, had been under constant observation since he had suffered a transversal fracture of his upper right central incisor in an accident three years previously. The pulp remained undamaged and vital and, therefore, the preservation of the tooth was indicated. The incisor was immobilized by a cast palatal splint which was worn for more than one year. After that time, the tooth appeared to be sensitive to cold, and roentgenograms revealed that the line of fracture remained unchanged.

After two years, however, the patient felt no difference in the function of the fractured tooth and that of other teeth. No discoloration appeared, and the tooth's reaction to cold (ethyl chloride) was positive.

The line of fracture obviously had healed by a fusion of connective tissue. The fractured tooth had acquired its full functional ability and, therefore, healing had occurred.

Oral surgery



Roentgenology

**Errors in roentgenography
and misinterpretation of
roentgenograms**

(Fehler beim Röntgen und Irrtümer bei der
Deutung von Röntgenbildern)

J. F. von Reckow. *Zahn Mund Kieferh. Vortr.*
16:90-108, 1955

Anatomic accuracy in dental roentgenograms can be achieved only by a correct reproduction of the size, site and condition of the objects and their relations to other oral structures. Even if the basic principles have been observed strictly, errors occur frequently.

The main rule in roentgenography, that the projection must be on the same level with the object, is often neglected. Even if the principle of bisection of the angle is applied correctly, the lack of skill of the operator causes hazy roentgenograms which are difficult to interpret.

In roentgenograms of the anterior teeth, the object often is distorted, or undesirable contractions in two dimensions occur. Spontaneous incidence of light frequently destroys the negative.

A specific roentgenographic technic, the Lemaster method, may prevent many errors, especially in interpretation of roentgenograms of upper molars. The target distance is about 18 inches, and the angle is bisected. This technic is accepted generally by dentists, and is taught in several dental schools.

The most frequent errors in taking roentgenograms, especially when the customary methods such as the diagonal exposure technic are applied, are: metallic shades of crowns and other prostheses overlap pulp cavities and bases, tooth roots and the limbus alveolaris, thereby causing misinterpretation of the roentgenograms, especially in instances of periodontitis; the zygomatic process covers tooth roots and the alveolar bone completely, and the relation which exists between alveolar sinus and dental arch is too indistinct for correct evaluation.

Lemaster's method, however, facilitates proper interpretation of roentgenograms, even if the method is combined with customary technics. Most of the sources of error are eliminated.

Many misinterpretations of roentgenograms occur because the structures of the zygomatic process are altered during the taking of the roentgenograms. The anterior region of the zygomatic process may lie in the direction of the roentgen rays, and, therefore, from the V-shaped shadow only the anterior surface is visible; the contours

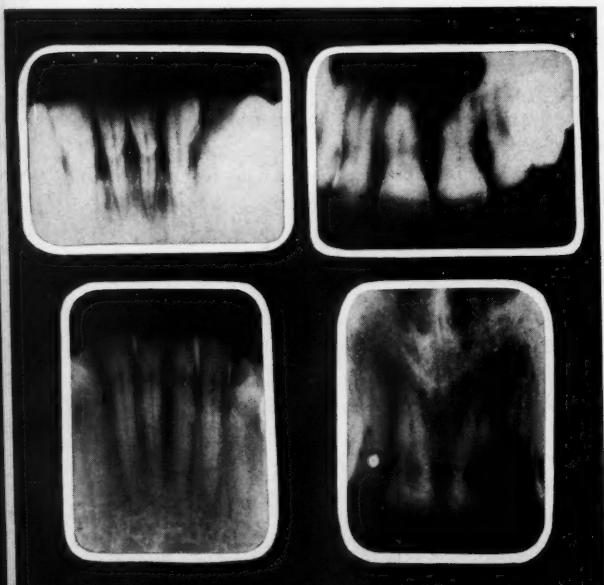


Figure 1 Correct and incorrect projection of 3 to 4 cm. roentgen films. Above: Horizontal (incorrect). Below: Vertical (correct)

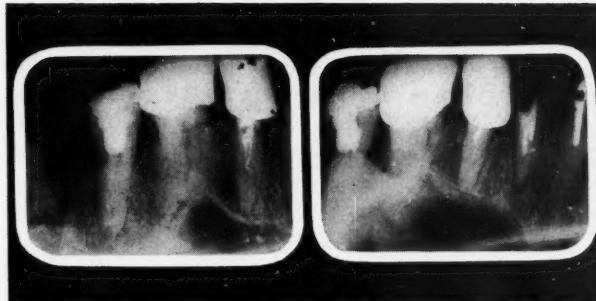


Figure 2 The marginal periodontium, correctly and incorrectly photographed. Left: Diagonal technic (incorrect). Right: Lemaster's method (correct)

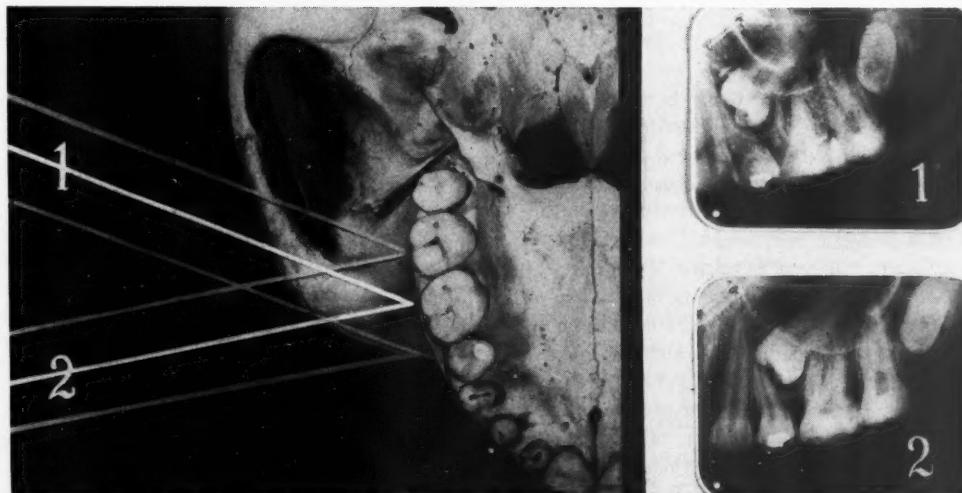
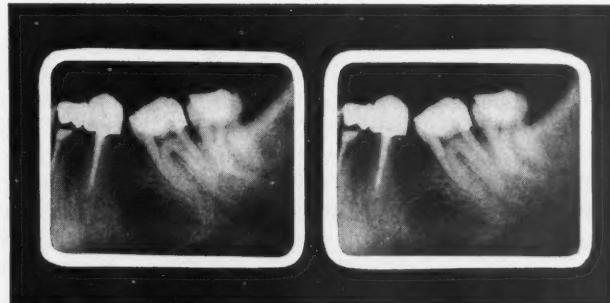


Figure 3 The zygomatic process. 1 = anterior edge of the V-shaped shadow. 2 = posterior edge of the V-shaped shadow. Above right: Diagonal technic (incorrect). Below right: Lemaster's method (correct)

Figure 4 Counter lights and overexposure promotes misinterpretation. Dark mask protects the observer's eyes against direct and indirect light. Lemaster's method makes correct interpretation possible.



of the dorsal inner surface, diagonal to the direction of the roentgen rays, are blurred.

The proper interpretation of the roentgenographic negative is made easier when a large dark mask is used which neither reflects light into the eyes of the observer nor permits blinding by indirect radiation of the light rays. By using such a black mask, the sensitivity of the eyes to the quantitative difference of light remains undisturbed, and the finest contrast in the roentgenographic negative or film copy can be observed.

Stereoroentgenograms in dentistry

Cyro A. Silva, São Paulo, Brazil. *Oral Surg., Oral Med. & Oral Path.* 9:757-764 July 1956

Although the stereoroentgenogram has several advantages in dentistry and although it has been approved by eminent dentists in Europe and Latin America, this method of examination has not attained favor. It involves technical difficulties and demands strict accuracy and patience. A new technic has been developed.

Two roentgenograms are made of the same region. The patient's head is kept in position by passing a bandage around the forehead and the headrest of the chair. The two films for the stereoscopic examination must be placed in exactly the same position. A chassis (which may be the corner of an envelope) is filled with compound. An impression of the region is taken and a mold is thus made which facilitates the repetition of the exposure as many times as desired, with the film in the same spot.

The shift of the roentgen-ray tube for the two exposures must be controlled perfectly. The mathematical angulation of Raper is used, with a tube-film distance of eight inches and a shift of the tube in both directions of eight degrees, more or less. The point of the cone is placed on the region to be examined, and the tube is shifted four degrees to the right. The direction of the central ray is maintained to the spot and the roentgenogram made. After this exposure, the tube is turned back to the correct position and shifted four degrees to the left for the left exposure. The used films must be marked "left" and "right," respectively.

The stereoscope, an optical instrument for viewing photographs or roentgenograms, records the blending of two images so that an impression of perspective, depth or third dimension can be obtained.

When the films are placed with the lingual side toward the viewer, everything which is nearer to the viewer will be in the lingual side. The films should be observed from both the lingual and vestibular sides.

The stereoroentgenogram is of value in localizing impacted and supernumerary teeth, retained roots, maxillary tumors and foreign bodies. Oral surgery is the specialty which benefits most from this method. The stereoroentgenographic method has also proved ideal in orthodontics where one needs an accurate view of the position of the erupting teeth.

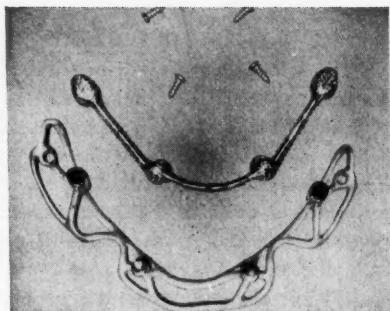
Cobalt-60 teletherapy of intra-oral cancer

William E. Costolow and William R. Wisdom. *California Med.* 84:288-289 April 1956

Since a teletherapy unit of 1,080 curies was installed at the Los Angeles Tumor Institute in 1952, the authors have used cobalt-60 teletherapy to treat 40 patients with intraoral cancer.

Among the physical advantages of high energy radiation are the more precise direction of the beam, reduced scatter and lessened effects on skin and bone. The results were uniformly good in early stages of lesions on the floor of the mouth, base of the tongue, hypopharynx, tonsil, soft palate and pharynx. In 21 instances of late stages of lesions, good results were reported in seven.

In the past, results of irradiation in the treatment of large intraoral cancers have been so uncertain and unsatisfactory that the more radical operative procedures—removal of the entire jaw, floor of the mouth and the tongue—have been used extensively. Although the period of observation of patients treated with cobalt-60 has not been long enough to warrant discussion of cure or permanent arrest, it is recommended that intraoral lesions be treated with radiation primarily; the radical operation should be reserved for those lesions that do not respond to cobalt-60 teletherapy.



Left: The substructure, superstructure casting and screws. Right: The mandibular ridge after the substructure was placed and the flaps sutured

▼
Plantation

Implant dentures: a case report and an evaluation

Philip M. Jones. *J. Univ. Kansas City School Den.*
19:16-20 Feb. 1956

It was decided to construct a subperiosteal complete denture implant at the clinic. The selected patient was a 58 year old woman who reported that after her lower teeth had been extracted, she had tried several good complete dentures; each had failed because of excessive irritation of the mucosa and the patient's inability to master the dentures.

A direct bone impression was made in red modeling compound in a stock aluminum tray. The impression was poured in stone and the extension of the substructure, that portion in direct contact with the bone, was outlined. A Vitallium substructure and the superstructure casting were fabricated by a laboratory in New York.

Thirty-five days later an incision was made along the original incision line, and the fit of the substructure to the bone was checked. An almost perfect fit was observed. A no. 702 taper fissure

bur was used to drill holes in the bone opposite the holes in the substructure. The 5 mm. Vitallium screws were driven into place. Within two weeks healing was almost complete, and the tissues appeared normal and healthy. A close adaptation of the mucosa around the posts was observed.

Four days after the incision, the superstructure casting was seated on the abutments and an alginate impression was made. This was poured in stone and self-curing acrylic resin. A jaw relationship was obtained, and casts were mounted on an articulator.

The completed denture was inserted July 9, and the patient was seen regularly for several days thereafter. It was unnecessary to "adjust" the denture, since all the occlusal forces were transmitted directly to the bone. The patient was no more conscious of such pressures than with natural teeth, nor was any sensation of pain from pressure reported. The esthetic result was most pleasing. An irritation of the buccal mucosa cleared up a few days after the denture had been inserted.

The denture has been in the mouth for five months. The patient expresses gratitude and enthusiasm for this service. She says that the satisfaction she enjoys with the present prosthesis is comparable to that with the natural teeth. There is no discomfort and mastication is very efficient. The patient finds it difficult to keep the abutments clean, although she had been instructed in the use of dental tape and a toothbrush. The mucosa of the ridge appears normal. The epithe-

lium has formed a cufflike constriction around each post.

Implant dentures should be considered only for that small percentage of patients who, for physical or psychological reasons, are unable to wear a conventional mandibular complete denture. The patient should understand what is involved in the construction of an implant denture, and should truly desire the service. Cooperation of the patient is essential.

Considerable postoperative pain and edema are frequently associated with the initial surgery.

The difficulty experienced by this cooperative and fastidious patient in maintaining proper hygiene around the abutments raises the question as to whether this may not prove to be one of the most serious problems associated with implant dentures. Calculus occurs around the abutments, just as it does on natural teeth. The calculus can be removed by the dentist. If the tissues are to be maintained in a healthy state, the posts and surrounding areas must be kept clean. This appears to be a difficult task for both patient and dentist.

A considerable number of patients who have been unable to wear conventional dentures are wearing mandibular implant dentures with considerable success and enthusiasm. Implant dentistry gives increasing promise of developing into a practical and commonplace procedure that will bring comfort and satisfaction to that small segment of the population who are unable to wear conventional dentures.

Implant dentures with Vitallium substructures and abutments (Vitallium vás és pillerek implantatioja egy mutéttel protézis készítéséhez)

Jozsef Dóra. *Fogorv.szemle* 49:129-135
May 1956

The implant denture is a comparatively new concept in prosthodontics. Although the results obtained with this technic have shown great promise, implant denture methods have not been accepted fully by international dentistry. The opposition is based on the assumption that implant dentures—no matter what materials are used in construction—violate physiologic principles.

At the Dental Institute of the University of Szolnok, Hungary, implant dentures with Vitallium substructures, attachment and abutments were inserted successfully in the upper and lower jaws of patients with oligodontia or anodontia.

The technic used in construction and insertion of implant dentures consists of the following: (1) an impression is taken of the soft tissues of the jaws; (2) dimensions of all oral parts involved are taken; (3) conventional dentures are constructed on models; (4) upper occlusal rims are inserted with soft impression wax; (5) modified types of Goldberg and Gershoff implant denture are designed with Vitallium substructures and attachments; (6) clasps and screws are attached to the substructures; (7) temporary, loosely fitting structures are made of acrylic resin; (8) the anterior teeth, for esthetic reasons, are placed on the temporary denture; (9) the temporary denture is inserted and its occlusion adjusted and (10) the completed implant denture is inserted with full cooperation between the prosthodontist and the oral surgeon.

The lack of complications in the majority of instances emphasizes the fact that this method is sound and practical.

The two necessary surgical operations can be performed in about one hour each, and the post-operative treatment concluded in about two weeks.

Sometimes, however, reconstruction of the substructure will be necessary because of tissue changes or slight dislocations of the implant.

Only when conventional prostheses have failed to obtain the desired results should the implant method be considered. The uncertainties involved often make it advisable to re-evaluate the benefits obtainable and the reasons for its use before such a calculated risk is taken.

Replantation of individual teeth

James P. McGuigan. *J.Canad.D.A.* 22:294-295
May 1956

Every dentist whose practice includes children should be acquainted with the procedure for replanting lost teeth. Success in the procedure depends on the time involved between the accident

and the replantation by the dentist. Many replanted teeth have been maintained in the arch for periods up to ten years. Eventually, the roots tend to resorb but this resorption may be overcome by making a preparation on the apical end with a shoulder similar to a jacket crown preparation and casting a Vitallium thimble and cementing it to the root.

A 14 year old boy was injured playing hockey, and came to the office with both maxillary central incisors removed, and without fracture of the teeth or alveoli. Clots were removed from the sockets, the teeth were cleaned and sterilized with benzalkonium chloride and alcohol, and the teeth replaced in their sockets. Roentgenograms were made to check the position of the teeth. Bite and alginate impressions were made. The teeth were then removed, the root canals opened, cleaned, and sterilized silver points were selected and sealed in the canals. The teeth were again sterilized and placed in position in the alveoli and their position determined with roentgenograms.

An acrylic splint was processed from the impression previously taken, and was trimmed, polished and cemented in position. The splint covered one tooth on each side of the replanted teeth. After five days the temporary splint was removed, roentgenograms and impressions were taken and a cast Vitallium splint processed and cemented in position. When the splint was removed six weeks later, roentgenograms were again taken and the teeth tested for mobility. When the above procedure is followed, the percentage of success with replantation will be high.

Correction of prognathism by the implant denture

Arthur C. Jermyn. *J.Implant Den.* 2:26-35
May 1956

The implant denture provides the dentist with a new tool to correct the loss of favorable relationship of the mandible to the maxilla that comes with resorption of the ridges.

A 47 year old woman patient, referred by a physician, had been under medical care for 15 years for neuralgia and pain throughout the left side of the head. She had to take sedatives con-

stantly and had lost interest in social activities because she was sensitive about her prognathic appearance. Examination revealed soreness in the region of the left temporalis muscle on opening and closing the mandible. The mandibular canal was partially dehiscent. The mental foramen were located on the linguosuperior surface. The slightest pressure of the finger along the top of this resorbed ridge caused the patient to wince. No conventional lower denture could be tolerated. The mandible was distorted, being bent wider and twisted lingually. The gonion angle was very obtuse.

A lower implant denture was fitted and the bite was opened gradually 10 mm.

The patient is happy with the results after more than two years of complete comfort and restored appearance. The pain and neuralgia disappeared within two weeks after the second stage in opening of the bite and has not returned. After more than two years, roentgenograms reveal no resorption beneath the implant, and the prognosis is excellent.

The author has corrected prognathism with lower implant dentures in several other severe cases. In such instances the implant denture is the method of choice. In three instances the patients complained of severe pains in the side of the head. All were under physicians' care, and were taking medication daily. On restoration of the correct vertical dimension and attainment of a more favorable jaw relationship the pain was eliminated.



Anesthesia and analgesia

Anesthesia for orodental surgery

John S. Stratton. *J.Am.Osteopath.A.* 55:715-716
July 1956

An anesthetic routine for patients undergoing oral surgery is described. The patient is seen in the office, or visited in the hospital for a physical examination and history. Routine laboratory work for major surgery is performed at least 24 hours

preoperatively; this includes chest roentgenogram, urinalysis, blood count, and determination of bleeding and clotting time.

The night before surgery the patient receives a sedative at bedtime (usually pentobarbital, 1.5 grains, repeated in four hours if necessary); one hour before surgery the patient receives atropine and meperidine, the dosage being determined by the age, weight and condition of the patient.

Thiopental sodium induction, using 5 to 6 cc. of 2.0 to 2.5 per cent solution, is used just to the extent of putting the patient to sleep, and the intravenous solution is started. Oxygen, 100 per cent, is administered until the patient has taken five or six breaths. Up to $\frac{1}{2}$ Gm. of thiopental sodium is then given rapidly. Succinylcholine chloride, 1 to 1.5 cc. (20 to 30 mg.) is given slowly into the intravenous tubing. Assisted respiration with 100 per cent oxygen is maintained gently for the next minute, as apnea or shallow respirations are expected.

A well lubricated tracheal catheter is passed through the right nostril to the posterior part of the pharynx. The laryngoscope with a curved blade is inserted to the epiglottis. The catheter tip is grasped with a curved catheter forceps and guided up and in back of the epiglottis. The catheter is then connected to the gas machine and a 50:50 mixture of nitrous oxide and oxygen is run into the system.

Assisted respiration may be necessary for one or two minutes. When respirations are resumed by the patient, the posterior pharynx is packed with a moistened gauze bandage. Maintenance anesthesia is usually balanced with nitrous oxide-oxygen and thiopental sodium.

An innovation in technique for dental gas

Arthur Tom. *Brit.M.J.* No. 4975:1085-1087
May 12, 1956

The Klock (1955) technic of "amnalgasia" for dental surgery was used on some 200 consecutive unselected patients, mostly children from 5 to 15 years old, in the school dental clinics maintained by the Gloucestershire County Council. The technic is revolutionary in that it postulates using a high percentage (20 per cent) of oxygen

with nitrous oxide. Klock defines the condition of amnalgasia as "a plane of surgical anesthesia between the so-called analgesia plane and the second or excitement stage, wherein surgical operations may be performed without pain or memory." For children under about 13 years of age, the Klock technic was amended in that about 15 per cent of oxygen was used.

The details of the technic are as follows:

1. Jectaflo machines are used.
2. Premedication is not used.
3. The patient is seated in the dental chair, a suitable mouth prop is inserted, and the child is instructed to blow out and in through the nose.
4. The machine is set to deliver nitrous oxide just off the pressure flow, a suitable-sized nose-piece is placed over the child's nose, and he is told to blow into it with his nose. After about two breaths the pressure is slightly increased and the breathing bag switched in to the circuit. After some four more breaths the machine is set to 15 per cent oxygen (for older children and adults, to 20 per cent oxygen). To assure nasal respiration, a piece of rubber dam may be held in the palm of the hand, over the patient's mouth.
5. The condition of amnalgasia is secured in about 40 breaths. Once established, it apparently can be maintained indefinitely; at this stage, the percentage of oxygen given children can be raised to about 18 per cent. The young patient is held in the chair by lady attendants rather than by straps.
6. Recovery is uneventful. The patients are bright pink, remain somewhat dazed with a pleased expression for a few seconds, recover smoothly, are a little unsteady on their way to the recovery room, but are soon normal. On being questioned, they say they have no memory of any pain, nor any knowledge that they have lost their teeth.

Claimed advantages include an absence of hypoxia, smoother operating conditions, no salivation, no limit to duration of anesthesia and so no need to hurry, no unpleasant after-effects and no undue delay in recovery. Gagging and swallowing reflexes are not abolished. Even children three years old react well to the technic.

So far the results have been uniformly satisfactory provided the patients were cooperative.

▼
Extractions

Burring of the alveolar ridge in exodontia
(El fresado del borde alveolar en exodoncia)

D. Apfelbaum. *Rev. A. odont. Argentina*
44:161-164 April 1956

Resection of the crest of the alveolar process (alveolar ridge) prior to a tooth extraction is of value. The resection is performed with a small surgical bur of medium caliber (or with a modified dentate fissure bur with a flat end). Preparation of a flap is not necessary. After anesthesia has been induced, a syndesmotomy, from the gingival margin to the bony crest, is made. If the dissection is sufficiently deep and even in all its perimeter, extraction of the tooth is carried out without any other maneuver. If it is not, resection of the alveolar crest by means of a surgical bur is indicated.

The most adequate bur for resection of the alveolar crest is a contra-angle bur. The bone is perforated by the point of the bur, and the bone tissue is resected by the lateral surfaces of the bur. The technic is as follows:

1. The bur is mounted on the handpiece or the contra-angle handpiece of the dental instrument. Petrolatum is applied to the point of union of the bur with the instrument to prevent blood and saliva from entering at this point.

2. The bur is introduced into the gingival sulcus parallel to the long axis of the tooth.

3. One side of the bur is placed in slight contact with the tooth, and the contact is maintained throughout the perforating and the resecting of the crest. Resection can be performed around the entire crest of teeth that are isolated because of the loss of the nearby teeth. When the teeth are in normal relation to the others, only the vestibular and lingual regions of the crest are resected. In some instances, namely, when diastemata are present or when the diameter of the involved tooth is small, the proximal region

of the alveolar crest can be resected without injuring the periodontal membrane.

The surgical bur should be used intermittently and the burring should be interrupted frequently. No speed should be applied as it may cause the temperature of the local field to rise with consequent necrosis of the bone. The depth of detrition of the bone is 2 mm. for the anterior and 4 mm. for the posterior teeth. A deeper level of detrition on the vestibular and the lingual areas of the crest than on the lateral surfaces diminishes resistance of these regions to luxation and makes possible a deeper grasp by the blades of the extracting forceps into the alveolus. The bony regions resected with the surgical bur are slightly polished with a common dentate fissure bur, which has a flat end and is of the same caliber as the surgical bur used earlier (no. 559 of S. S. White type or no. 3 Ash type). This polishing results in a clean-cut margin of the section.

The tooth extraction is carried out by introducing the blades of the forceps in the space made by the resection until the sectioned bony crest is contacted.

Resection of the vestibular and lingual regions of the alveolar crest with a surgical bur is also indicated when a curved elevator with a thin blade is to be used as a lever for lingual luxation of the lower third molars. When roots that have been used as anchorage for abutments of crowns are to be extracted, it is advisable to fill the root canals with cement prior to the extraction in order to prevent fracture of the root.

Resection of the alveolar crest is indicated in all instances in which tooth extraction may be complicated by fracture of roots, severe alveolar trauma or difficulty in grasping the root due to advanced caries and the condition of the roots and teeth before the extraction. Immediate and mediate management of tooth extraction after resection of the alveolar crest is the same that is routinely used. A stitch on the gingival margin can be made if it is necessary.

Resection of the alveolar crest has the following advantages: (1) it facilitates the maneuvers of tooth extraction, (2) it diminishes the probability of fracture of the roots and the frequency of complications, mainly hemorrhage and alveolitis, and (3) it accelerates the healing process that follows extraction.

Periodontics and endodontics



Periodontics

**A new technic for fixation
of loose teeth in the treatment
of periodontal disease**

(Nuova tecnica per la fissazione dei denti
in parodontopatici)

Guiseppe Ceria. *Minerva stomat.* 5:85-88
March-April 1956

Immobilization and fixation of loose teeth play a major part in the treatment of periodontal disease.

Previous methods to obtain the desired fixation, especially when interdental elastic fasteners were used, have many disadvantages. The immobiliza-

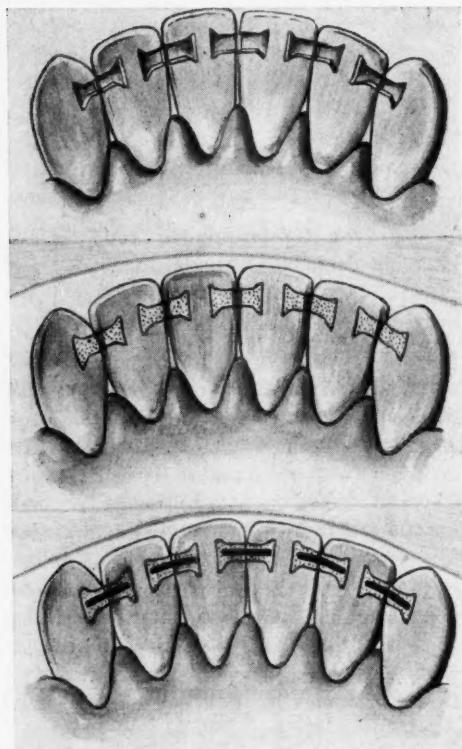


Figure 2 *The interdental splint technic. Above: Preparation of retention cavities. Center: Filling with self-curing acrylic resin. Below: Connection with interdental splints from one tooth to the other*

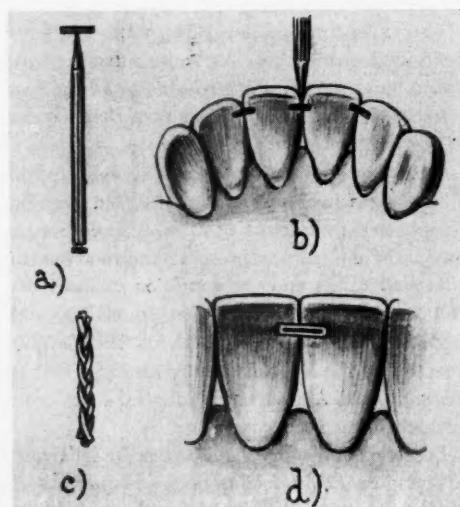


Figure 1 *The customary fixation technic: (a) the instrument used, (b) connection from the left lateral incisor to the right lateral incisor with elastic fasteners, (c) the chain of fasteners, (d) fixation of the central incisors*

tion failed in all instances in which the teeth were too loose to be fixed by comparatively soft fasteners, or when these fasteners had been left in position for more than a year.

A new method to obtain complete immobilization of loose teeth was introduced by the author. This method has been tested thoroughly at several Italian dental schools, and it is now used frequently in dental practice in treatment of simple and complicated forms of periodontal disease. The results achieved and reported were almost unanimously favorable.

The new method includes improvements and modifications of the fixation techniques used and recommended by Obin and Arwins, Berliner, Peter, Sauerwein, Woodward and many others.

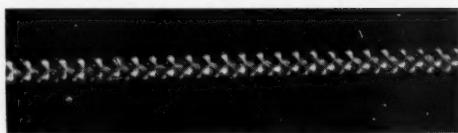


Figure 3 The chain used for interdental splints

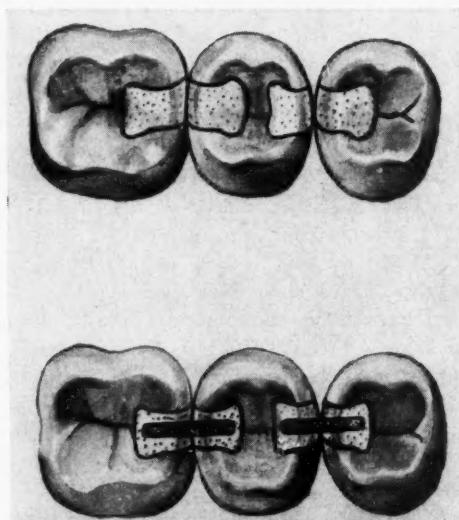


Figure 4 The interdental splint technic in bicuspid and molars. Above: Preparation of cavities and filling with self-curing acrylic resin. Below: Connection with interdental splints

The new technic consists of the following procedures: (1) preparation of retention cavities in the proximolinguinal surfaces of incisors and cuspids or in the proximobuccal surfaces of bicuspid and molars; (2) protection of the pulp by application of layers of silicate cement; (3) filling of the prepared cavities with self-curing acrylic resin; (4) polishing all fillings and surfaces until they are smooth; (5) insertion of indented wire splints which are fastened to the fillings with self-curing acrylic resin; (6) drilling two holes above the contact points into the fillings; (7) connecting the inserted, indented wire splints from one tooth to the other, and (8) testing to make sure that a firm immobilization of the loose teeth is obtained by the continuous chain of interdental splints.

With this method, a durable and effective immobilization of all loose teeth is achieved. The interdental splint technic can be used either before or after the elimination of calculus and the bacteria accumulation in the periodontal pockets.

Because of its simplicity and rapidity of execution and the comparatively moderate costs for material, the interdental splint method will be a valuable aid both to the dentist and the patient in the treatment of periodontal disease, especially periodontitis.

Acid caustics in the treatment of periodontal lesions

Philip S. Haley. *J. California D.A. & Nevada D.Soc.* 32:178-179 May-June 1956

A technic has been developed for applying strong inorganic acids in the treatment of periodontal lesions. A full strength nitric acid in a fresh fuming condition is perhaps the best of the acid caustics, although its advantages over fuming hydrochloric acid are not great. These may be used for the reduction of pocket tissue or for incision into fluctuating periodontal abscesses. Sulfuric acid is of nearly equal value in periodontal treatment; it causes less hemorrhage, but deteriorates quickly *in vitro* to form a dark, discolored liquid. These acids, when supplemented by phenol, can be used successfully to treat all instances of chronic periodontitis and periodontosis. Dietary and vitamin factors are also used, malocclusion is corrected, and the patient instructed in oral hygiene. The treatment takes more time but offers the following advantages: no anesthetic is required; bacteremia is unlikely to occur; no surgical packs are needed; the procedure is simple, and phenol packs, left in the pockets, act as surgical dressings, after which healing proceeds by natural means.

The acid is not allowed to touch the crown of the tooth, but should it do so, a brief application of a 10 per cent solution of sodium bicarbonate will render the acid harmless.

The field is blocked off with flexible cotton rolls saturated with a 10 per cent solution of sodium bicarbonate; the rolls are kept pressed against the gingiva beyond the line of cauterization. From five to ten probes, tightly wrapped in cotton,

should be available. A water syringe filled with the sodium bicarbonate solution, and a glass tumbler of the solution, should be ready for the patient to rinse if necessary. The probes are saturated with acid; any excess is removed by pressing the saturated probe against a piece of absorbent tissue. Suitably sized probes are worked both within and without the pocket until sufficient tissue has been removed. The cotton rolls may be removed from time to time to allow the patient to rinse. Any loose or frayed tissue may be trimmed by the use of phenol packs which are placed beneath such tissue and allowed to remain there for from 12 to 48 hours. Should the patient swallow a few drops of phenol, he may gargle with a 5 per cent ethyl alcohol solution.

Not many pockets are treated with acid caustics at one sitting. The method rather is used as an adjunct to phenol cauterization.

Alkaline caustics are equally as useful as acids where only a superficial effect is desired.

A review of the history of periodontology up to the founding of the American Academy of Periodontology in 1914

N. E. Wickham, Auckland, N.Z. *D. Practitioner* 6:316-319 June 1956

Ancient history records that the Egyptians, Greeks, Romans and Chinese but not the Hebrews referred to periodontal disease. Hippocrates in 460 B.C. and Democritus in the first century A.D. recognized the association between lack of cleanliness and inflammation of the gingiva. Galen (131 A.D.) appears to have been the first to correct the occlusion by grinding. Paul of Aegina in the seventh century recommended the filing of protruding teeth, and advised the removal of tartar, avoidance of tainted and glutinous foods, and the cleaning of teeth, especially after the last meal of the day.

Abulcasis, a Moorish surgeon in Spain in the eleventh century, described calculus and designed scalers for its removal. Ambrose Paré in the sixteenth century outlined a technic for the use of scalers. He used nitric acid and alcohol to remove deposits not removed by the scalers.

Pierre Fauchard was the first to advocate the

use of a ureic mouthwash for the control of periodontal disease. He wrote: "Rinse the mouth every morning, and also in the evening before going to bed with a few spoonfuls of one's own urine, immediately after it has been emitted, always provided the individual be not ill." Fauchard recognized the part played by sepsis in dental disease, was the first to distinguish scorbutic periodontal disease, propounded theories on the formation of calculus, and referred to the splinting of loose teeth.

Bourdet in 1757 and Jean Serre in 1791 wrote books stressing the importance of oral hygiene. Kunstmann seems to have been the first to attempt the surgical treatment of periodontal disease, and published a book on the subject in 1772. Leonard Koecher in 1826 wrote *Principles of Dental Surgery*, with a chapter including nearly all that is now known regarding the practical diagnosis and the conservative treatment of periodontal disease. Other men of the nineteenth century to contribute to the theory and treatment of periodontal disease were John M. Riggs, David D. Smith, William J. Younger, Fox, Harris, Lintott, Forbes, Talbot, Patterson, Fletcher, Barnes, Bowman and Chase.

At the beginning of this century, Sydney Rauh spent his life educating the profession and the public in the value of preventive dentistry as a health measure. Alfred Fones originated the idea of instructing young women to give prophylactic care of the teeth in dental offices, and in 1913 established the first school for dental hygienists.

The relation of the physical character of the diet to the periodontium and periodontal disease: a collective review

Paul N. Baer. *Oral Surg., Oral Med. & Oral Path.* 9:839-844 Aug. 1956

The experimental and anthropologic literature relating the physical consistency of the diet to its effect on the periodontium is reviewed, and the following conclusions are reached:

1. Periodontal disease is found in animals, primitive cultures and modern societies.
2. The physical consistency of a diet which requires vigorous mastication appears to have a

beneficial effect in the prevention of periodontal lesions in animals.

3. The physical consistency of a diet which requires vigorous mastication does not seem to be as effective as proper oral hygiene in the prevention of periodontal disease in man.



Endodontics

Roentgenographic and histopathologic studies of chronic periodontal granulation after root canal treatment with hydroxyl iontophoresis (Röntgenologische und histo-pathologische Studien über das Schicksal chronischer parodontaler Granulationsprozesse nach Wurzelbehandlung mit Hydroxyl-Ionophorese)

David Haunfelder. *Stoma* 8:131-170 Aug. 1955; 9:26-52 Feb. 1956

At the Dental Clinic and Polyclinic of the University of Würzburg, Germany, the pathologic symptoms of chronic periodontal granulation processes appearing after root canal treatment have been investigated roentgenographically and histopathologically.

In the patients examined, the complete disinfection of root canals was obtained by hydroxyl iontophoresis. The root canals then were filled

with iodochlorhydroxy-quinoline silver cement and closed with gutta-percha points.

The pathologic processes appearing after root canal obturation were evaluated roentgenographically, and the occurrence of regeneration could be determined.

The treatment of chronic apical periodontitis was confined to conservative procedures.

In instances in which no pathologic symptoms appeared after root canal obturation and in which the re-establishment of the bone and the periodontal tissue with the lamina dura had been verified in roentgenograms, the assumption seemed justified that recovery, or at least cicatrization, had taken place.

It was established that in the conservative treatment of chronic apical periodontitis, hydroxyl iontophoresis has a therapeutic influence on the condition of the teeth in the periapical region.

Hydroxyl iontophoresis strengthens the natural forces of resistance, and can be recommended if the condition is acute.

Favorable results with hydroxyl iontophoresis also were obtained in instances of primary apical osteitis, presence of cysts in the oral cavity, and after apicoectomy.

In one instance, it was even possible to arrest a resorptive infectious process which obviously was caused by faulty tooth replantation.

Histologically, an intensive healing process was observed in nearly all patients in whom hydroxyl iontophoresis had been used. This method promoted a transformation of infected tissue into healthy connective tissue.

Armamentarium



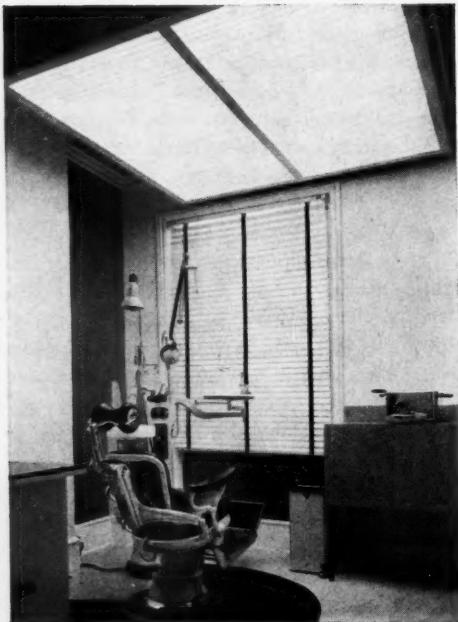
Equipment

New lighting system in dental surgery

D. Practitioner 6:358 July 1956

A shadow-free lighting system, with an intensity of 100 lumens per square foot at working height, is available. The "lumenated" ceiling is available in the form of a false ceiling of translucent corrugated vinyl sheet suspended in a lightweight steel framework. The lamp is housed in the space between the false and true ceilings so that the lumenated ceiling appears to become the source of illumination.

The surgery installation, designed to meet the requirements of the dental surgeon, utilizes a false ceiling six feet square, erected immediately



above the dental chair. Strips of hardboard one foot wide, fixed from the perimeter of the framework to the true ceiling, form a lightproof cavity. Illumination is provided by six five-foot, 80-watt white fluorescent tubes.

Cinefluorography: technical refinements

S. A. Weinberg, J. S. Watson and G. H. Ramsey.
Am. J. Roentg. 75:63-68 Jan. 1956

Among recent developments in the field of roentgen ray motion pictures are (1) a flicker-free, slow speed projector for analyzing cinefluorographic film, and (2) a method for combining cinefluorography with conventional cinematography.

If maximum information is to be extracted from roentgen ray motion studies, the film should be viewed both in motion and as stills. A special 16 mm. projector has been developed with the help of engineers of the Eastman Kodak Co. It is a modification of the Kodak Analyst projector which is much used by athletic coaches for post-mortems on games. With the modified Analyst, reasonably flicker-free projection is possible at speeds as low as six frames per second. The change from continuous to single frame operation can be made instantly without special adjustment of focus or illumination. These time-saving features encourage a closer reading of roentgen ray motion studies.

Cinefluorography and conventional cinematography can be combined in order to have the subject appear partly transparent (penetrated by roentgen rays) and partly solid. This is done by replacing the fluorescent screen of the cinefluorographic unit with a pane of glass or Lucite and by attaching to the glass a smaller screen, covering only a portion of the camera field. The position and shape of the screen will depend on the effect sought.

So far, the only practical use of this surrealist device is a series of films of normal speech made in collaboration with John Lotz, of Columbia. The larynx, pharynx, soft palate and most of the tongue are shown by roentgen ray, but the nose, lips and chin are shown by surface lighting.

Also described are a stereo projector for cine-

fluorographic films taken by the rotational method, the adaptation of motion picture cameras to ultra high speed lenses, and direct cineroentgenography on 70 mm. film.

Air turbine handpiece motors

Richard R. Stephens. *Brit.D.J.* 100:345-351
June 19, 1956

The main advantage of a handpiece driven by an air turbine is that a simple flexible tube takes the place of the engine arm; therefore, such a handpiece is supremely mobile. It is possible to walk about with the handpiece held in any position in the hand while it maintains a constant speed. A second advantage is that speeds are obtainable which are much higher than those given by conventional electric engines with endless cord drives. The enamel cutting properties of diamond points, wheels and disks improve remarkably as the speed range of 30,000 to 50,000 rpm is reached. Little pressure is required to remove enamel when cutting at these speeds, and there is no tendency for the cutting instrument to "walk," climb or slip over an edge. The direction of rotation may almost be disregarded, and the sensation noted resembles a wiping away of enamel rather than a grinding down.

Penetration and cutting of enamel and dentin are so rapid that fissure cavities in posterior teeth may be prepared in a matter of seconds, using only a single cylindrical diamond. Proximal cavities in deciduous molars with minimal caries may be cut at these high speeds with two diamond shapes only. It would seem that an air turbine dental handpiece with the same torque as a die grinder, but with a lower speed range, would be an excellent tool for the rapid preparation of multiple cavities under general anesthesia. Such a handpiece would also be of use in oral surgery for operative procedures involving bone.

Disadvantages are that air turbines are noisy, their torque is poor at low speeds, and they cannot be stopped readily.

Details are given of the construction in different materials of two basic types of turbine rotors. Improvements and modifications of the prototype models are considered.

▼ Materials

Gutta-percha (Guttapercha)

F. C. Münch. *Dent.Echo* 26:48-50 June 1956

Gutta-percha is a term applied to the evaporated milky fluid or latex obtained from several types of trees found mainly in the East Indies and in Brazil.

The best gutta-percha is obtained from two trees belonging to the *Sapotaceae*, the *Palaquium gutta* and the *Palaquium oblongifolia*. Related trees yield similar but inferior products.

Gutta-percha is prepared from the grayish milky fluid, the latex, secreted in cylindrical vessels or cells in the cortex. When an incision in the bark is made, the latex flows not nearly as freely as that of Indian rubber.

Chinese and Malayans have been acquainted with gutta-percha for centuries and have utilized this material for many purposes, especially for wound dressings and tooth fillings.

On the European and American market, gutta-percha is available in gray blocks, often with a reddish tinge. It is comparatively hard, inelastic and solid, just soft enough to be indented by a fingernail, and it remains tough at average temperatures. About 60 per cent of gutta-percha is crystalline; the other parts are amorphous. When heated in the absence of air at a high temperature, gutta-percha decomposes into a mixture of isoprene and higher hydrocarbons. When exposed to air and light, it deteriorates rapidly, absorbing oxygen and forming brittle resins. Ozone attacks gutta-percha quickly and with similar results.

Crude gutta-percha contains resinous components which are deleterious and can be removed by solvents.

Because of its comparatively high cost, gutta-percha is gradually being replaced by synthetic materials. In dentistry, however, gutta-percha has not lost its importance. No other thermoplastic impression material has such a lasting, exact and resistant plasticity as gutta-percha—a quality necessary for correct imprints of teeth or gingiva. Gutta-percha also can be used for linings, but

as it tends to shrink, dentures with gutta-percha linings should be cast immediately.

Black gutta-percha is used in the construction of obturators.

Many dentists still prefer gutta-percha for tooth and root canal fillings, especially for temporary fillings. The dentist, acquainted with the characteristics of this material, uses white, pink or ivory gutta-percha sticks for temporary fillings, and plates with white or red tinges for permanent fillings. The filling surface should be touched with a chloroform cotton plug to obtain a smooth finish.

Black gutta-percha plates should be heated in water and dried slowly with a towel before use. For filling purposes, the gutta-percha sticks can be heated on a moderately warm electric plate or exposed to the hot air stream of an electric radiator to obtain the desired plasticity.



Instruments

Sharpening periodontal instruments

Calvin L. Foss and Thomas R. Orban. *J. Periodont.* 27:135-143 April 1956

"Nothing in the technical procedure of dental practice is more important than the care of the cutting edges of the instruments," stated G. V. Black.

Nearly all types of periodontal instruments may be sharpened with relative ease. Necessary

equipment includes the following: a good, diffused light such as a sewing machine light; a magnifying glass with a light built in; a notched instrument rest of metal or wood, fastened to the workbench by a vise to support the instrument; an assortment of mounted and unmounted stones, including mounted ruby stones, an Arkansas or fine India wedge-shaped slip stone and truing stones, and a small hand motor unit, possibly with a pulley extension to accommodate attachments.

Instructions are presented for sharpening the hoe, file, sickle, curet and knife.

Instruments should be made of good carbon steel. Instruments of stainless steel will not sharpen easily nor hold a good edge. Sharpened instruments should be wiped clean with gauze and alcohol or some other solvent. The ruby and India stones may be washed in soap and water, and the Arkansas stone wiped with oil. Oil stones may be kept in a tray lined with several layers of gauze saturated with a high quality thin oil. Steel jewelers' files are ineffective on instruments made of good steel.

In each of two or more drawers, a complete set of instruments should be kept. One set should be used per patient. When the second set is used, the first should be sterilized. Dull instruments are placed in a separate, marked receptacle and are immediately replaced with a fresh duplicate.

Sharp instruments are essential to skilled dental procedures. They facilitate clinical procedures by lessening the time of operation, lessening the strain on the operator and giving the patient a greater feeling of relaxation and confidence. Sharp instruments require less pressure on tooth or tissue, thus causing less trauma.

Orthodontics and pedodontics



Orthodontics

**A new method for construction
of orthodontic activators**

(Ein neues Verfahren der Aktivatorherstellung
für den Praktiker)

Walter Weise. *Zahnärztl. Welt* 11:51-52
Feb. 10, 1956

The activator still is the classic orthodontic appliance, and in its construction the Andresen-Häupl technic is used primarily.

A new construction method, however, has been introduced recently by the staff of the Western German Orthodontic Clinic of the Medical Acad-

emy of Düsseldorf, and has been tested thoroughly at several German dental institutes and in orthodontic practice.

This method not only saves hours of valuable chair time but simplifies the work without causing any decrease in functioning of the apparatus.

The initial appointment is devoted to the collection of data necessary for diagnosis and treatment planning. Full-mouth roentgenograms and cephalometric measurements are made and evaluated, impressions are taken, and the individual occlusal bite is determined.

During the second appointment, construction bites are taken which should show the buccal cusps of all posterior teeth. Wire attachments, labial arch wires and guides are fastened to the models with wax. Alginate impressions are made with the attachments in place. Working models which are poured from the impressions provide accurate casts from which the activators can be constructed.

Between the second and third appointments, two lingual arch wires are constructed. The acrylic resin in the anterior palatal vault then is covered with a double wax plate which contacts the fibrous mucous membrane of the palate. This

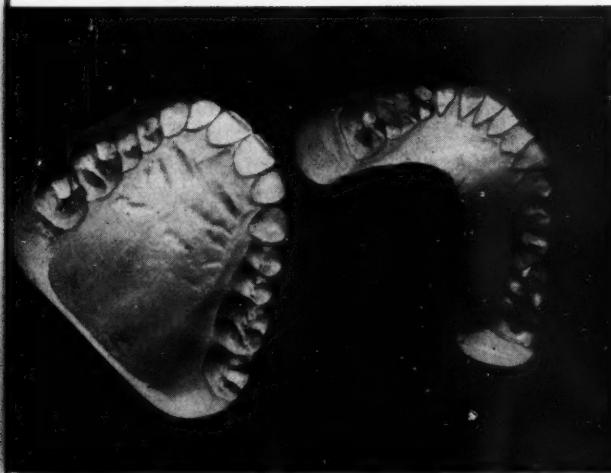
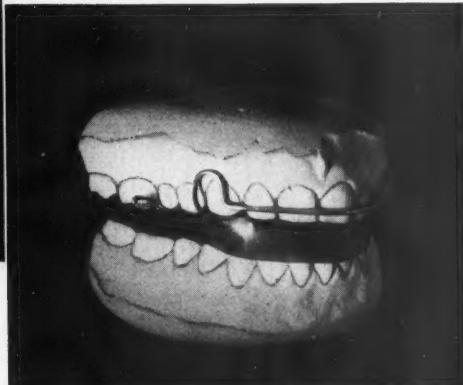


Figure 1 The working models

Figure 2 The models with construction bite and wire attachments



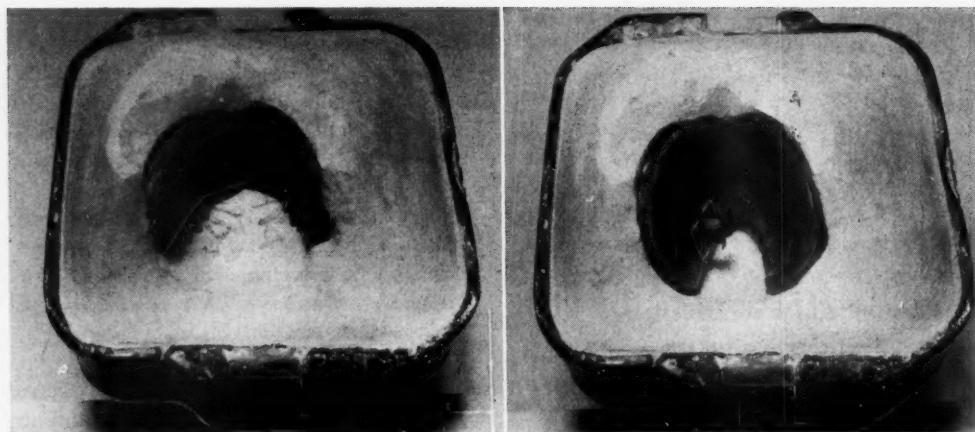


Figure 3 Left: The models with attachments imbedded. Right: Application of the double wax plate and an adjustment screw

procedure replaces the time-consuming modeling used in customary construction technics.

During the third appointment, several adjustable screws are attached to the double plate, after their correct positions have been marked on the models. Space closure in the incisor region is the next step, and when the posterior occlusion seems to be satisfactory, the activator is ready to be inserted.

The apparatus, constructed with this technic, is an efficient orthodontic appliance. Extreme care must be exercised in its use, however, because sometimes too much force can be exerted on the cuspids. Such a force may crush the periodontal membrane at the distal side of the alveolar crest of the cuspid roots, and may alter the position of the cuspids by tipping their crowns in a distal direction and the root apex in a mesial direction.

The problem of extraction

Alexander Sved. *Am.J.Orthodont.* 42:511-525
July 1956

The extraction of teeth for the correction of malocclusion was practiced in the early days of orthodontics, even before orthodontics became a recognized specialty of dentistry. Angle, who asserted that without a full complement of teeth

normal occlusion cannot be established, was opposed to extraction for corrective purposes. He maintained that the preservation of the integrity of the arch is a basic requirement for successful orthodontic treatment.

The frequent relapse after treatment, however, led to the belief that the supporting bony structure was not sufficient to accommodate the tooth material. Today Tweed's teachings favoring extraction are widely accepted, and a larger number of teeth are sacrificed as an essential part of routine orthodontic service than at any time in the past. Most orthodontists, seeing the frequent relapse of occlusions which were protrusive after the completion of active treatment, have accepted the assertion that "in most malocclusions the basal bone is not large enough to accommodate the teeth arranged in normal occlusion."

Although this conclusion may be true, it is subject to several errors. The fact that the basal bone has never been enlarged by orthodontic means does not preclude the possibility that some day it may be done efficiently. Again, it is not certain that the enlargement of the basal bone is necessary; it is possible that the basal bone will support any enlargement of the alveolar processes necessary to reduce the apparent protrusion.

The author, in 37 years of practice, has not found it necessary to extract teeth for the treatment of any kind of malocclusion. Tweed failed to consider the beneficial influence of future nor-

mal growth, and did not recognize that at the termination of active treatment the work is not quite completed. The problem of retention has been neglected. Most retaining appliances are inadequate. The author depends entirely on the recently developed Vitallium adjusters.

A record of 100 consecutive and completed cases is now being collected. All were treated without the extraction of any teeth. Of the 60 completed cases, examination shows that the excellent results continued.

No orthodontic treatment should be considered finished at the time the active appliances are removed. Each occlusion is improved during retention. The relapse of orthodontically treated occlusions is caused not so much by discrepancies between the basal bone and the tooth material as by inadequate retention. Tweed's concept of the disharmony between basal bone and tooth material is erroneous. The alveolar processes can make up for any discrepancy between the basal bones and the dentition. By means of the Vitallium adjuster, it is possible to develop the alveolar processes.

The extraction of four teeth for orthodontic purposes reduces the efficiency of the dentition by 12.5 per cent. The extraction of teeth is inimical to the welfare of the patient and never should be recommended.

Orthodontic concepts prior to the death of Edward H. Angle

Allan G. Brodie. *Angle Orthodont.* 26:144-154
July 1956

After the introduction of the bandeau by Fau-chard, and its refinement by Bourdet, it was recognized that expansion of the arch could be achieved by forces working from the lingual side, and there followed a long line of such devices, including the jackscrew, the expansion plate and, much later, the lingual arch.

Extraction played a large part in the early efforts to regulate the teeth, and it was carried to excess.

Blandin in 1836 commented on the effect of the dentition on the face. He was among the first to comment on the force of dental function in its

role of developer of the body of the mandible, the malar eminences and the infraorbital foramen. In 1844 the work of Lefoulan, setting forth the view that the dental arch could be enlarged, was translated into English.

The publication of Darwin's *Origin of Species* in 1859 influenced all biological thinking. Embryology and comparative anatomy became subjects of intense importance. The detailed study of occlusion, both of animals and of man, which had been carried on by Owen between 1840 to 1845, took on new significance. In 1860 Angell called attention to the "six year" molars; he named these teeth the "keystones of the arch."

In 1887 Isaac B. Davenport wrote: "Nature has furnished man with two dental arches so formed and so placed in relation to each other as to be supported at every point while permitting all movements necessary for the perfect comminution of its food."

As early as 1803 Fox had advanced a classification of malocclusion. This was followed by classifications by Delabarre in 1819, Blandin and Kneisel in 1836, Carabelli in 1842 and Andrews in 1865. Most of these were based on the relation of the upper and lower incisor teeth, although the jaws were mentioned in a few. Orthodontic management was directed principally toward the upper arch and consisted mainly of expansion efforts.

About 1850 Norman Kingsley first used occipital traction on the upper teeth by means of swagings which covered different teeth and which were connected through face-bows and elastics to headcaps.

Angle published his first text in 1887. In 1899 he announced his classification based on the laws of occlusion, and the whole emphasis in the field of orthodontics was changed. The field was brought into order with a precise goal to be attained—normal occlusion. This new concept caught hold almost universally, and the Angle classification has never been challenged successfully. Gradually Angle came to embrace a concept of functional development. He perceived the possibility of aiding growth by uprighting teeth that had been tipped during treatment. He introduced the working retainer.

Edward H. Angle died in August 1930, and with him an era died and another was born.

Psychosomatics in orthodontics

John William January. *Am.J.Orthodont.*
42:597-607 Aug. 1956

The psychosomatic theory postulates the inseparability of mind and body, the wholeness of the individual, and the idea that the bodily state may be influenced by the mind just as the mental state may be influenced by the body.

The psychic influence, working through the autonomic nervous system, can be a factor in dental disease. A dentofacial deformity, because it distorts the patient's image of his body, can cause psychic trauma which may lead to dysfunction of the personality structure and altered behavior.

A dentofacial deformity constitutes an ever-present source of suffering, varying in degree from embarrassment to great mental anguish. It may be a factor in many neuroses.

Each person carries about a mental image of his own appearance. Normally, this image is a pleasing one. When it is not personally pleasing, the individual is more or less ill from a psychiatric viewpoint. The body image is based on two sets of factors: (1) what one actually sees and feels concerning oneself and what is perceived of oneself in the reactions of others, and (2) psychologic factors which are an outgrowth of personal emotional experiences. Modifications in actual appearance of the body can cause rapid and sometimes far-reaching changes in the body image. Orthodontic treatment, by causing changes in the body image, can be of psychotherapeutic importance. Essentially, orthodontic treatment is psychosomatic therapy, a treatment for the psyche as well as for the soma. Psychosomatics can be an adjunct to orthodontic diagnosis and practice.

Psychosomatic orthodontics is good orthodontics because it integrates the trinity of component factors in orthodontic practice: mechanics, physiology and psychology.

Adoption of the psychosomatic viewpoint of the wholeness of the individual, with its emphasis on the human equation, will give the orthodontist a deeper understanding and a happier relationship with his patients and a greater personal satisfaction in his professional role of furthering human happiness.

Pedodontics

A devitalizing technic for pulpotomy in primary molars

Max Nacht. *J.Den.Children* 23:45-47
First Quart. 1956

Members of the Vancouver Pedodontic Study Club observed a high percentage of failures with the pulpotomy technic using calcium hydroxide. A one-appointment treatment was sought which could be used on the pulps of deciduous teeth in all stages of degeneration except death.

A review of the literature revealed interesting work with mummifying pastes, done by Hess, Foster, Easlick and Sweet. A uniform technic was adopted. The paste used was made from a liquid containing phenol, formaldehyde, creosote, thymol and from a powder containing barium sulfate, iodine and paraformaldehyde mixed immediately prior to its insertion.

The technic involves the following steps: (1) anesthesia and rubber dam application; (2) routine preparation of the tooth for reception of the permanent filling material; (3) complete removal of the roof over the pulp chamber; (4) removal of the bulbous portion of the pulp; (5) control of hemorrhage; (6) application, with slight pressure, of an adequate quantity of the thick mummifying paste; (7) placement of cement over the paste to provide a firm base for the permanent filling material and (8) placement of the permanent filling material.

Some 467 teeth so treated were observed for periods up to five years. Repeated clinical examinations showed no evidence of any degeneration except for some 30 teeth which developed acute symptoms and had to be extracted. Roentgenographic evidence revealed no significant changes for the first two years, after which there appeared to be a progressive loss of bone in the bifurcation, resulting in an early loss of the deciduous molar and the corresponding early eruption of the succeeding permanent tooth. At no time was there any discomfort to the patient. The tooth remained functional throughout its retention. The technic normally requires no more than 45 minutes.

Prosthetic dentistry



Crown and bridge

A technique for making a cast gold thimble and its conversion to the indirect full crown

Maurice J. Saklad.

New York Univ. J. Den. 14:69-70 Jan. 1956

A recommended procedure for making a cast gold transfer coping follows:

1. White masking tape $\frac{1}{8}$ to $\frac{1}{4}$ inch wide is moulded accurately to the outline of the gingival termination of the preparation on the copper electroformed die, to a thickness of about 0.5 mm.

2. The coronal portion of the die is lubricated and dipped repeatedly into a small tumbler of molten wax to form a wax coating sufficiently thick so that it can be cast to possess stable and retentive qualities.

3. The work is allowed to cool. The excess wax that extends beyond the shoulder onto the masking tape is trimmed with a scalpel.

4. The masking tape is peeled off.

5. The wax core is gently removed.

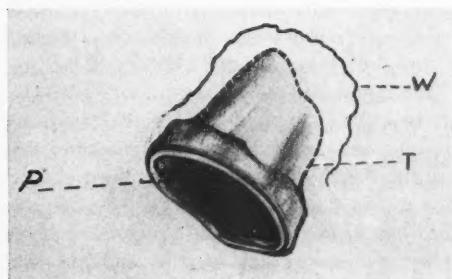
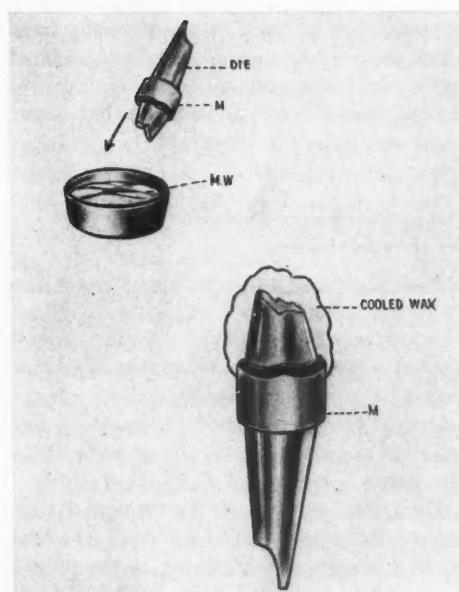
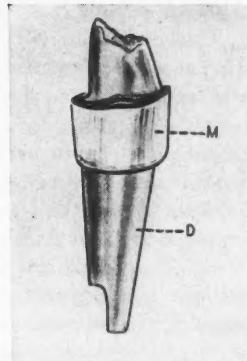
6. The core's interior surface bears the imprint of the gingival termination of the preparation. This is the finishing line. All wax gingival to the finishing line is removed. A Bard-Parker knife is used to trim to the imprinted line, the blade being held perpendicularly to the wax. With a shaving motion a knife-edged finish is achieved at a 45 degree angle to the imprinted line. The work is replaced on the die and readapted.

7. Droplets of carding wax are added to the buccal and lingual surfaces, to serve as removal buttons.

8. The work is sprued from the occlusal surface, invested and cast.

The usual procedures are followed for cleansing and adapting the cast transfer to the die.

The cast gold transfer may be utilized as either the core for the indirect full crown wax pattern,



M—masking tape

D—die

MW—molten wax

W—cooled wax

P—imprint of gingival termination of preparation

T—inner surface of thimble

or in the making of a provisional splint for protecting prepared teeth pending completion of the restorative treatment.

When the thimble is to be used as a core for the wax pattern in making an indirect full cast crown, the following technic is suggested: The transfer coping is cleaned with carbon tetrachloride, scuffed with a bur or disk, boiled for about 10 minutes in 50 per cent nitric acid, and refitted on the die. The marginal fit is rechecked. Wax is added to form the shape of the desired restoration. The work is sprued and ready for investment, which should be made in two steps. A thick putty-like mixture is made on a glass slab, placed inside the core and permitted to dry. Thereafter the regular investment procedures are followed in preparing for casting the complete restoration.

The preparation of abutments for veneer retainers

Robert E. Willey. *J.A.D.A.* 53:141-154 Aug. 1956

The veneer retainer—by far the most reliable method of attachment to a tooth—has shown itself to be so well qualified to withstand heavy functional stresses that fixed bridges so supported are considered comparable to any other dental restoration.

From the viewpoint of biomechanical engineering, the veneer retainer is correct. The term "veneer" implies the overlaying of the coronal portion of the tooth with a thin layer of gold alloy, the stability of which is obtained by the frictional retentiveness of slightly convergent walls and grooves. The veneer is primarily a surface covering of a part or all of the entire crown.

The domelike form of metal, augmented by the trusslike support of the grooves, comprises a mechanical design highly capable of resisting distortion. Forces directed against these veneers tend to seat them more firmly on their preparations. The veneer also ties the structural elements of the crown more tightly together, and thus eliminates the possibility of fractured enamel walls or cusps. When teeth which have suffered extreme carious inroads are to be restored or used as bridge abutments, application of the veneer principle enhances the strength of these teeth.

In youthful patients and others having teeth with large pulps and extended horns, the veneer principle recommends itself because of its greater safety.

Fundamental principles in the preparation of a three-quarter veneer restoration are described and illustrated. The same principles apply to the preparation of a half crown, seven-eighths or full veneer crown.



Complete dentures

Dietary procedures for edentulous patients (Dentiers et régimes)

Bernard Wissmer. *Rev. mens. suisse odont.* 66:112-119 Feb. 1956

Edentulous patients, when they are not wearing artificial dentures or during the time between tooth extraction and denture insertion, undoubtedly have a reduced ability to masticate.

This lack of normal masticatory function should be compensated by a diet which reduces the necessity of exerting masticatory forces but still provides the necessary elements indispensable to the body and its tissues.

Since edentulous patients usually avoid meeting people, they often decline to consult a physician regarding a diet suitable to their changed condition. It is important, therefore, that dentists become more acquainted with the main rules of alimentary hygiene. Only by the selection of a proper diet can physiologic and psychologic requirements for the health of edentulous patients be met.

The diet recommended consists of about 2,400 calories for men and about 2,000 calories for women. It should contain the following: protein, 70 Gm.; calcium, 1 Gm.; phosphorus, 1.3 Gm.; iron, 0.012 Gm.; vitamin A, 5,000 I.U.; thiamine, 0.001 Gm.; niacin, 0.002 Gm.; riboflavin, 0.012 Gm.; vitamin C, 0.075 Gm.; and vitamin D, 400 I.U. for men—the protein, niacin and vitamin C content may be slightly reduced for women. The daily nutritional intake should contain shredded

meat, fish or poultry; milk or milk products; eggs; small amounts of fat (butter or cream); citrus fruits and raw tomatoes; other shredded fruits; vegetables (green or yellow); small amounts of potatoes and of enriched cereals; larger amounts of whole grain cereals; replacements for sugar, and, if necessary, additional vitamins. Such a diet must be prepared in liquid or semiliquid form after tooth extractions and for the period of tissue healing.

As soon as possible, however, the patient must take a more complete diet based on his digestive condition prior to the prosthetic treatment.

Some factors affecting the full lower denture

G. A. Lammie. *Fort. Rev. Chicago D. Soc.* 32:7-9, 31-32 July 1, 1956

Too often, a static view is taken of anatomy; actually, the form of the parts is constantly changing, and this is of practical significance in complete denture prosthetics.

Aging is characterized by a reduction in the number of component cells in a tissue, especially one highly differentiated in nature. In old people the oral mucosa becomes thinner and reduced in surface area. There is also an associated atrophy of the submucosal tissues so that the alveolar bone and facial muscles come to be covered with a soft tissue layer of decreasing depth. Microscopic examination reveals histologic changes in the nature of the elastic fibers with age. The fibers become thicker and straighter; there may be a replacement of elastin by collagen. The net result of the reduction in surface area and the change in nature of the elastic fibers is a loss of elastic quality in the cheek and mucosal reflection.

With loss of elasticity the sulcus tends to change more on opening the mouth; the mucosal reflection is raised nearer to the alveolar crest, and a sharp angle between alveolar and cheek

mucosa is associated with a tautness in the tissues. This change can only mean that a denture extended to the resting or compressed depth of the sulcus is subjected to a displacing force as the mouth opens. To avoid such displacement, the denture periphery must be extended to a functional height and a thin denture flange maintained.

If the elastic quality of the mucosa is lost and if the submucosa is reduced in depth, the potentiality to develop a "sealing" action is absent; one must accept the fact that a positive retention cannot be obtained.

Since the placement of any component of a denture in the field of action of a muscle leads to its displacement, regardless of the degree of the retaining forces developed, the lower anterior teeth must be placed in the neutral zone between the lip and the tongue. The necks of lower anterior teeth should be placed directly over the ridge. Whereas in a younger adult these teeth can be given a natural forward inclination, in an aged patient they must be sloped back to accommodate the backwardly inclined lip of the aged. This posterior positioning of the anterior teeth will not restrict tongue movements, provided adequate room is given to the root of the tongue by setting narrow posterior molar teeth well buccally, and always lateral to the mylohyoid ridge.

Sometimes the bone of the lower anterior alveolar ridge is noncortical; in such instances, roentgenograms show the free surface of the bone to be formed of vertically running trabeculae. When it is also considered that the mucosa and submucosa covering this type of bone may have become thin, the whole of the load placed on the denture is transmitted over the projecting bony trabeculae. Overlying nerve endings are stimulated and pain results. The solution of this vexing problem can lie only in the replacement of the lost resilient layer which was formerly present in the overlying soft tissues, in the denture itself. The development of a satisfactory soft lining material is a great need in prosthetic dentistry.

Professional activities



Miscellaneous

Skin protection in dental practice

(Beitrag zum Problem des Hautschutzes in der zahnärztlichen Praxis)

Hans W. Herrmann. *Deut. Zahnärztl. 10:325-327 May 8, 1956*

In the hazards of dental practice, not only the patients are involved. The hands of the practicing dentist are always exposed to cuts and wounds caused by his fine and sharp instruments. Whether infection by pathogenic microorganisms occurs depends on the dentist's immunity or resistance toward these microorganisms, on the virulence of invading bacteria, fungi, viruses and yeasts, and on the condition of the tissues involved.

Injuries to the skin which are caused by chemicals or poisons frequently lead to dermatoses. According to Wurmbach's statistics, more than 80 per cent of dentists are or have been afflicted with dermatologic diseases. Mercury and arsenic, strong disinfectants (either acids or alkalis), antibiotics and even customary soaps may serve as

causative factors for occupational diseases of the hands of dentists and promote eczemas. Chlorine in the water may be in a concentration sufficient to cause primary irritation. All these effects can be increased by chronic stimulation or idiosyncrasy.

Many hand lotions contain large quantities of alcohol and glycerine which dry the skin and make it susceptible to external irritation.

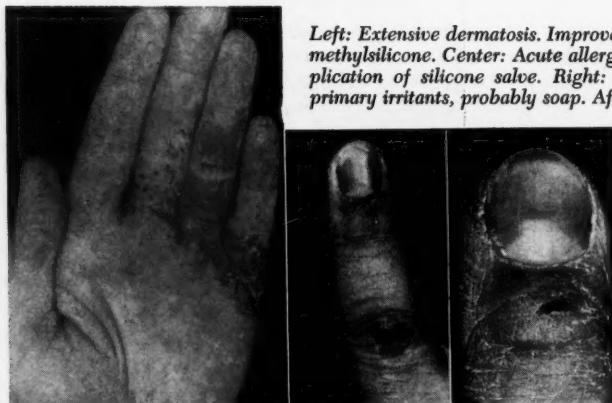
Topical anesthetics are potent sensitizers, and an individual may be hypersensitive to any one of these compounds or to the whole group.

Chromic acid and its compounds (chromates in dental alloys) also are potentially sensitizing substances.

Mercurials in amalgam fillings may produce allergic reactions. Also plastics such as phenol-formaldehyde, amino and cellulose acetate types can act as allergizing factors. Other potential allergens are resins of gutta-percha, metals such as nickel, silver or tin, the so-called cold sterilizing antiseptics such as iodine or Formalin, rubber dams or rubber gloves, adhesive tape, x-ray films, and the substances used in film development.

The eczematic alterations of the dentist's hands usually begin at the terminal phalanges of the fingers, knuckles and interdigital spaces, and spread over to the arms, shoulders and other parts of the body.

In addition to eczemas of the hands, the dentist may develop infection of hair follicles of the dorsum of the hands; chronic folliculitis, impetigo and erysipelas.



Left: Extensive dermatosis. Improvement after application of salve containing methylsilicone. Center: Acute allergic contact dermatitis. No relapse after application of silicone salve. Right: Contact dermatitis of thumb caused by primary irritants, probably soap. After application of silicone salve

The fingernails also are frequently the site of occupational infections. Dystrophic nail alterations usually are caused by inflammatory disturbances of the nail beds.

In the search for hand lotions and ointments that protect the skin, the silicones which are known in industry as smearing and isolating materials were tried and tested at the Dental Institute of the University of Bonn, Germany. These nonmetallic tetrad elements possess a structural relation to organic silicates. It was established that methylsilicone was the most significant material among the group examined. Its properties are: (1) resistance to heat; (2) little tendency to physical irritation; (3) insensitivity to most organic polymers; (4) tolerance to most drug effects, and (5) absolute chemical purity.

Biologic examination of methylsilicone as a suitable preventive to occupational skin diseases of dentists revealed that in 109 instances of different types of dermatosis no dermal alteration, neither edema nor enlargement of the epidermis, and no toxic effect were observed after application of methylsilicone. Even contact irritation caused by handling acrylic resins disappeared after use of silicone covers.

Silicic salves have been approved as skin protective agents in industry; therefore, their utilization for purposes of protection in dental practice can be recommended.

Talbot, MacGregor and Crowe in the United States, and Schneider and Hussong in Germany, already have reported excellent results in skin protection from macerating wound secretions (pus, saliva or urine) by silicone salves. These salves are absorbed by the skin immediately, so that the feeling of touch and grip is not decreased. The physiologic acid layers of the skin are preserved by the pH value of the salves. The hydrophobic effect prevents the fluids from adhering to the skin. By continuous application, the silicone film will act as an "invisible glove" preventing the occurrence of new dermatoses. Skin irritations, already present, can be cured without interruption of daily work.

The care of the dentist's hands will be made easier by the use of silicone salves, and contamination is prevented without the danger of epidermal enlargement (acanthosis) or edematogenous skin alterations.

Dentistry around the world

Short history of dentistry in Sweden

T. Brandrup-Wognsen. *Internat.D.J.* 6:202-204 June 1956

A decree of 1663 in Sweden established a state authority, "Collegium Medicum," which licensed those practicing dentistry. A compulsory examination was introduced in 1797, at which time mostly dentists from abroad were practicing in Sweden. A Swede first passed the dental examination in 1833.

The Dental Society of Stockholm was formed in 1860 on the recommendation of the Director-General of the Royal Health College who wanted an organization with which he could discuss questions regarding the practice of dentistry. The first real law on practicing dentistry was established June 18, 1861; with minor alterations this law was valid until 1951. In 1861 the Dental Society of Stockholm was reorganized to include dentists from the whole country; in 1881 the name was altered to the Swedish Dental Society (Svenska Tandläkare-Sällskapet) which is still its name. Its main object is "the work on the evolution and the practical application of dental science." The organization has sought improvement in dental education. In 1879 the Royal Medical Board prescribed that the matriculation examination should be a prerequisite for admission to dental studies. The first government subvention to dental education was granted in 1883 and the next year a polyclinic for dental diseases was established. The first dental school was established in 1897.

After 1900, with the increase of social and economic problems, a new organization, the Swedish Dental Federation (Sveriges Tandläkareförbund) was formed to deal with such problems. It has an executive committee, a board and a general assembly consisting of representatives from 25 regional and other dental associations. Other organizations (referred to as "sections") connected with the Federation are: Swedish Dental Officers' Association, Swedish Armed Forces

Dental Officers' Association, Association of Dental Officers at Hospitals, Association of Teachers at the Dental School in Stockholm, and the Association of Teachers at the Dental School at Malmö.

The Swedish Dental Federation has developed into the equivalent of a powerful trade union with the right of negotiation, well suited for taking care of the social and economic problems of the Swedish dental profession. On numerous occasions the Federation, in cooperation with the Society, has made proposals to the state authorities regarding public dental health services, the increase in the number of dentists and the improvement of dental education.

In 1938 the Swedish Parliament established a general public dental health service, Sweden being the first country with such a service.

Dental education has been reorganized since 1940. The minimum duration of dental courses has been increased from three years to five years. The Dental School in Stockholm, which had been a subdivision of the Royal Medical School, was made independent. A new school was founded at Malmö in 1950, and in 1955 the Parliament decided that a new division of the Dental School in Stockholm should be located in the northern part of the country, at Umeå.

In 1945 an employers' organization of the private practicing dentists was established. In 1954 the Swedish Dental Federation passed a resolution that every dentist in private practice who has in his service organized ancillary personnel must be a member of this employers' organization.

**Ten years of dentistry in Slovenia,
Yugoslavia (Dosec let slovenskega
zobozdravstva)**

Jože Rant. *Zobozdrav. vest.* 10:191-194
Oct.-Dec. 1955

Before the end of World War II, no dental school existed in Slovenia, one of the federal republics of Yugoslavia. Only in the three large cities, Ljubljana, Maribor and Celje, were dental clinics attached to medical schools and hospitals.

Two dental polyclinics had been assigned to take care of all Slovenian school children. Dental service was obtainable in the dentists' private of-

fices, which were located chiefly in the larger cities.

In 1945, with the founding of the University of Ljubljana, the first Slovenian dental faculty and the first dental university clinic were created. The dental faculty, in its administration and educational program, is completely independent from the medical faculty.

The beginning was difficult. No skilled staff was on hand; no suitable wards, equipment, instruments and materials were available. The work was started by a few enthusiastic dentists, and the completion, in 1946, and a later extension of the dental clinic have been accomplished by the manual labor of those dentists and their friends.

Since 1954, the new dental clinic with its departments for prosthetics, orthodontics, endodontics, pedodontics and oral surgery has functioned successfully as the center of Slovenian public dental service.

Simultaneously with the opening of the dental clinic, dental education and scientific research began. The dental faculty of the university permits dental specialists, practicing dentists and dental technicians to attend 28 graduate and postgraduate courses. The compulsory curriculum consists of two year courses on the subjects of all branches of dentistry and of a three month course on traumatology.

The Slovenian Dental Association has organized regular monthly meetings. The Dental Section of the Medical Association of Slovenia works in full cooperation with the Dental Association. At each meeting, lectures are given, and reports from the national and international dental literature are discussed.

In Slovenia, dentistry now is taught according to modern scientific principles and educational systems. After six years of study, the graduates receive the title of Dr.med.stomat. In regard to basic sciences and public health, dental education still is associated with the study of medical sciences.

Recently, a professional school for dental technicians was created and attached to the dental faculty. Previously, dental technicians were trained privately by practicing dentists, and their purely mechanical instruction was similar to that of apprentices in industrial professions. Today, the training of dental technicians is based on strict

governmental regulations, and takes place in special schools of high school rank. To enter such a school, the applicant must have passed four classes of secondary school (Gymnasium) and an entrance examination. After a four year study in dental laboratory work and courses in general education, the student must pass a final examination (Matura). Thereafter, the graduate is entitled either to practice as a dental technician (under supervision of a licensed dentist) or to apply for entrance in a dental school of college rank.

In 1945, the dental journal *Zobozdravstveni vestnik* (*News of Dentistry*), edited and published by the Slovenian Dental Association, made its appearance.

Five national and three international dental congresses have been held in Ljubljana, and Slovenian dentists have participated in many dental congresses abroad. Several Slovenian dental scientists and educators now lecture at foreign dental schools.

Slovenia can be proud of its 116 dental clinics and 15 polyclinics for preschool and school children, all of them well-equipped and directed by skilled dental specialists.



Auxiliary groups

The dentist and his assistant

Philip W. Card. *J.A.D.A.* 52:580-583 May 1956

A survey made by the American Dental Association in 1950 indicated that dentists employing one auxiliary averaged 37 per cent more patients than those without, and those employing two auxiliaries averaged 69 per cent more patients.

The dentist gains the following advantages from utilizing the services of a properly trained assistant: (1) mental and physical strain on the dentist is reduced; (2) the office acquires prestige, dignity and a more professional atmosphere; (3) working hours and office routine become more systematized; (4) the danger of legal entanglements is minimized, and (5) an additional contact is supplied in building the practice.

Four disadvantages include the expense involved, the period of training necessary, the possible waste of time if the assistant seeks another position, and the possibility of personality conflicts.

The selection of an assistant is a matter of the utmost importance. Factors to consider include the character, physical qualifications, mental ability, neatness of appearance, age, poise, pitch of voice and personality of an applicant. The dentist should select an assistant whose personality is in accord with his. Wages, hours, sick leave, vacation times, the number of uniforms to be worn during the week, coffee periods, use of the office phone and other details should be discussed and understood.

The first week of employment is crucial. The assistant must expect to receive careful supervision in the fulfillment of her duties. The dentist should show patience, consideration and helpfulness.

Service at the chair should exclude duties as secretary or bookkeeper; no one person can properly perform all functions in a modern practice. The assistant's place is at the side of the dentist and not at the front desk.

The assistant should be encouraged to take a certification course, to join the local assistants' association, to go with her doctor to state and national meetings, and to study professional literature.

Proposed report on educational qualifications of public health dental hygienists

Philip E. Blackerby, Jr. *Am.J.Pub.Health*
46:899-905 July 1956

During the past 40 years dental hygiene education has evolved from an unorganized and largely practical course to a standardized, two-year collegiate program. Since 1946 the number of schools with dental hygiene education facilities has doubled; in 1955 there were 34 such schools in the United States and Hawaii. The practice of dental hygiene now is licensed in every state and territory.

The future outlook in public health for the

dental hygienist is potentially great. With the exception of certain diagnostic, surgical and restorative dental procedures, the hygienist is legally and technically qualified, in most states, to carry on the other clinical aspects of a dental public health program, such as charting of teeth in dental surveys and the application of topical fluorides.

There are 819 dental hygienists engaged in some form of public health work, either full-time or part-time, distributed as follows: federal health organizations, 8; state health departments, 46; city and county health departments, 162, and school health programs, 603. Those in public health work constitute from 10 to 20 per cent of the total professional group.

The current plan of two years of general college courses followed by two years of dental hygiene curriculum produces a mature, broadly educated hygienist, but does not qualify the graduate for work in the public health field.

It is suggested that:

1. The education of the public health dental hygienist consist of two years of dental hygiene education followed by two years of training in public health and education including appropriate minors in arts and sciences and leading to a bachelor's degree.
2. The two years of postprofessional training be offered by schools of public health, with the curriculum developed and taught in cooperation with their respective schools of education and dental hygiene.



Licensure

The Dentists Bill

Laurence Webley. *D. Practitioner* 6:325-327
June 1956

The Dentists Act, which received the Royal Assent on March 15, 1956, is a landmark as it makes the dental profession a self-governing one with its own council, the General Dental Council, with a registered dentist as president. The Dental Board,

which was to some extent controlled by the General Medical Council, is abolished.

The General Dental Council will be a corporate body with a common seal and the power to own property. Of its 18 members, 11 will be elected by dentists from among themselves, 3 more dentists will be nominated by the Queen, and 4 nondentists will be nominated by the Queen and the Governor of Northern Ireland. In addition, further members, all dentists, will be nominated by the various dental authorities in the proportion of one each, save for the University of London, which is allowed two members. The General Medical Council will nominate six members who will act only in matters connected with dental education.

The Council is charged under the Act to promote high standards of professional education and conduct, to discipline and educate the profession, and to maintain the Dentists Register.

A disciplinary committee, consisting of the president and ten other members of the Council, will inquire into cases arising under Section 13 of the Dentists Act, 1878 (registered dentist convicted of crime or guilty of disgraceful professional conduct).

The Council will keep the Register. Colonial and "foreign" dentists are entitled to be registered if they can satisfy the Council as to their character, knowledge and skill. A registered dentist becomes entitled to use the description "dental surgeon" by virtue of his registration. The Council may prescribe appropriate titles for any branch of dentistry which, in its view, has become so distinctive as to justify such a distinction on the ground of professional and public convenience.

The Act prohibits the carrying on of the business of dentistry by an individual, not a registered dentist or medical practitioner, unless he was in business on July 21, 1955. If he does so, he becomes liable to a fine of \$1,440 on indictment. The Act contains exceptions to the foregoing prohibition in favor of personal representatives, widows or children of deceased registered dentists or medical practitioners, who may carry on his business of dentistry for three years. The meaning of "business of dentistry" is defined as the receipt of payments for services rendered in the course or practice of dentistry.

The Act empowers the Council to establish

classes of ancillary dental workers, to prescribe the necessary qualifications and the work which they may undertake, and to establish rolls or records. In general, work amounting to the "practice of dentistry" must be performed under the direction of a registered dentist. The Act contains an interesting provision for the establishment of an experimental training scheme, which may be instituted by the Council on the requirement of the Privy Council, to judge the public value of a class of such workers permitted to undertake fillings and the extraction of deciduous teeth under the Health Services.

The Council may appoint visitors to report as to the sufficiency of the instruction in centers where dental training is being given.

The Act provides a framework within which the dental profession can, and no doubt will, develop as a completely self-governing and autonomous profession.

fever. Generally, the mentally disturbed children referred to the clinic are those who are difficult to manage because of their inability to comprehend and cooperate. Normal children for whom pedodontic consultation or treatment is desired are also accepted on referral.

Both indigent and private patients are treated. The private phase of the program is administered under a plan of limited private practice.

The clinic is integrated with other services in the University Medical Center. Many patients need the combined attention of both dentists and physicians; consultation between members of the dental clinic staff and physicians in the College of Medicine is routine. The department of pediatrics frequently refers children to the dental clinic, and many clinic patients are examined and treated by University pediatricians.

If a child's muscular control is such that treatment in a dental chair is impossible, the child is treated under general anesthesia in the University's General Hospital. Many mentally retarded and emotionally disturbed children are also operated on in this manner.

Clinic patients provide a source of data for research in the dental problems of handicapped children. Both dental students and dental hygiene students receive training in the clinic.

Kenneth E. Wessels, professor and head of pedodontics in the University's College of Dentistry, is director of the dental clinic at Iowa City.



Hospital dental service

Special clinic at University [of Iowa] for handicapped children

Iowa D.J. 42:145 June 1956

A dental clinic for handicapped children was established in the Hospital-School for Severely Handicapped Children of the State University of Iowa, in January 1955. The clinic has three purposes: (1) to help youngsters whose physical, mental or emotional conditions pose major treatment problems; (2) to take the burden of caring for these children off the general practitioner of dentistry, and (3) to provide treatment for the children enrolled in the Hospital-School. An outpatient service is conducted for sick or handicapped children referred to the clinic by their own private physicians or dentists for dental consultation or treatment.

Most of the physically handicapped children suffer from five conditions—cerebral palsy; congenital and acquired heart disease; post-polio-myelitis; muscular dystrophy, and rheumatic



History

Emile Magitot:

"The father of experimental dentistry"

J. F. Volker. *J. Canad.D.A.* 22:397-403 July 1956

Emile Magitot was born in Paris in 1833. His father, a physician, was a practicing dentist. Emile graduated as a physician at the age of 24; his thesis was entitled "The Development and Structure of Teeth." With Robin, the professor of anatomy, he published in 1860 and 1861 the "Genesis and Evolution of Teeth in Man and the Lower Animals." Shortly thereafter, with Legros

he undertook a study of the formation and eruption of the teeth which has been basic to all subsequent studies on the chronology of the human dentition.

Magitot's career as an active investigator extended over a 40 year period; his 65 publications cover almost every phase of dental research including anatomy, physiology, biochemistry and pertinent observations on oral diagnosis and treatment. His contributions to dental research rank with those of W. D. Miller or G. V. Black. His great work, "Treatise on Dental Caries," published in 1877, has been translated into English by Thomas Chandler.

Magitot's conviction that persons practicing dentistry should initially qualify in medicine brought him into opposition with the dentists in France. Magitot was the pioneer in that branch of medical science known as stomatology. In 1888 he founded the Society of Stomatology, composed of dentists who had taken a medical degree.

Although most of his work related to the study and care of the teeth, Magitot considered himself a stomatologist and not a dentist. He loved theory and did not give to the dental operator the credit he deserved, nor did Magitot keep pace with the advances in operative dentistry. He believed that the application of any apparatus to the teeth should be the work of a physician, and that the manufacture of the apparatus should be left to the expert, the mechanical dentist. Today, it is believed that the dentist should do this work himself, or at least intelligently guide his assistants.

Magitot preferred the term "buccal surgery" to dentistry. By the science of stomatology he meant the theoretical study of the mouth and teeth. Magitot's researches touched on many phases of dentistry, including the following: geographical pattern of dental caries; caries frequency; physiology of the dentin; tooth surface plaques, acid production and caries susceptibility; microorganisms and acid production; experimental caries; the oral physiology of sugars; the diagnosis of dental caries, and the technics of restorative dentistry.

On Magitot's death in 1897 the Odontological Society of Chicago adopted a resolution recognizing the services of Magitot to the advancement of dental science. The resolution stated in part: "No writer of any age has made so many, so varied,

and so valuable contributions to dental science as Magitot. The priceless services rendered by him entitle him to rank as one of the foremost investigators in odontology."

Early history of Alabama dental laws

Bul. Alabama D.A. 40:20-23 July 1956

Alabama was the first state to pass an act regulating the practice of dentistry. On December 31, 1841, the state legislature approved Act 26, Regulating the Practice of Dental Surgery. This law provided that any applicant to practice dental surgery must be examined by the state Medical Board. Although the first law was a step in the right direction, it was a poor one and was amended seven times during the next 41 years.

The Alabama Dental Association was organized October 6, 1869, at a meeting held in the office of J. M. Hereford, of Montgomery. J. G. McAuley, of Selma, was elected the first president. Annual meetings were held for the next four years, but a yellow fever epidemic in Mobile forced cancellation of the 1874 meeting, and the organization gradually became defunct. In 1880 it was reorganized, and W. D. Dunlap was elected president. In 1880 Dunlap, T. M. Allen, of Eufaula, and G. M. Rousseau met with Saffold Burney, of Mobile, and drew up a legislative proposal to establish a Board of Dental Examiners. The bill was passed by the state legislature February 11, 1881. It set up a separate Board of Dental Examiners to be composed of five dental practitioners to be elected by the Alabama Dental Association. All dentists who could supply satisfactory evidence that they had practiced dentistry for a minimum of five years prior to the passage of the act automatically received a license without payment of a fee. Also, any dentist who had been licensed previously by a state medical board could obtain a license without examination or fee, as could any applicant who could supply evidence that he had received a diploma from any incorporated dental college. Violators of the law were subject to fines of from \$50 to \$300. The law stated that nothing in the act was to be construed to prevent persons from extracting teeth.

On May 1, 1955, the records of the secretary of

the Board of Dental Examiners showed that 1,136 dentists held licenses to practice in Alabama. Only 12 were women, and of these 4 were negro women. The remaining dentists were grouped as follows: 745 were in active practice within the state; 46 were retired; 58 were in the Armed Forces; 8 were with the Veterans Administration or the state health department; 7 were members of the dental school faculty; 5 were interns or residents; 257 were practicing outside the state, and 10 had unknown addresses. Of the total number, 80 were negroes, of whom 59 were practicing within the state, 7 were in the Armed Forces, 10 were practicing outside the state, and 4 had unknown addresses. The state has issued more than 2,000 dental licenses in its history.

On September 29, 1919, Alabama enacted a law regulating the practice of dental hygiene by auxiliary personnel. As of June 1954 the state had issued 317 such licenses.

which the following 4 complaints accounted for 45 of the 82: (1) Too long a wait for an initial nonemergency dental appointment, 7 per cent; (2) attitude of "charity medicine," 5.5 per cent; (3) too long a wait in the waiting room, 6 per cent, and (4) dissatisfied with therapy from a physician or dentist, 4 per cent.

Members who used the plan found the quality of professional care satisfactory and were able to establish stable patient-doctor relationships with the same frequency as they had before becoming eligible for the plan.

The plan provided 77 per cent of the total professional services of the sample. The most frequent reason for using outside service was a strong attachment to some dentist or physician who was not on the staff of the group.

Of the respondents 31 per cent felt they had never received an adequate explanation of the services and benefits of LHI, and 17 per cent had no knowledge of the specific services available.

▼ Industrial health plans

Membership attitudes in the Labor Health Institute of St. Louis

Nathan Simon and Sanford Rubushka.
Am.J.Pub.Health 46:716-722 June 1956

The Labor Health Institute of St. Louis, Mo., founded in 1945 by Local 688 of the International Brotherhood of Teamsters, is one of the oldest and most successful comprehensive, pre-payment group practice plans. LHI provides comprehensive dental and medical care to about 15,000 union members and their families. LHI is financed by employer contributions of 5 per cent of gross wage payments in most of the shops covered.

A random sample of 199 adult members of LHI were questioned about their attitudes toward the plan. The plan received the overwhelming endorsement of the respondents, less than 10 per cent expressing active dislike of the plan.

Fifty-six respondents made 82 complaints of

Dental insurance offered to groups

New York Times 105:42 May 8, 1956

A nonprofit group dental insurance plan for low income employees was announced May 7 by Dental Insurance Plan, Inc., Brooklyn. The plan covers employee and union groups of 50 or more persons. At least 75 per cent of the people in a group must sign up to be eligible for benefits. The cost is \$1 a month for each insured person, or \$2 a month for each insured person and his spouse, and 90 cents each for children under the age of 18 in the family of the insured. Leo Marcus, Brooklyn dentist, is president of the Dental Insurance Plan. Local 32 of the Building Service Employees International Union has already signed up.

The plan provides for an annual clinical examination of the mouth; annual roentgenographic examination; annual cleaning of teeth; all necessary fillings of silver amalgam or porcelain; extractions where indicated, and emergency visits requiring any of the foregoing services. Insured persons can go to a participating dentist of their own choice. The plan will be available in New York City and nine counties in New York State.

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Miscellaneous

Dental hygiene: its definition, evolution and mission

Louis J. Baume. *Schweiz. Mschr. Zahnhk.*
66:518-626 May 1956

Modern dentistry, as an internationally recognized branch of the healing arts, is concerned with the pathology of the oral cavity and associated parts, with diagnosis and treatment of oral diseases and with the restoration of defective and missing oral structures. Dental procedures should be based on biologic principles and be executed by well-coordinated mechanical methods.

Oral or dental medicine can be defined as the nonmechanical phase of dentistry which brings the application of the basic sciences, especially that of human biology, and the fundamentals of general medicine to the practice of dentistry. Dental medicine, therefore, should be the expression of a medical attitude toward dental practice rather than an independent specialized branch as visualized by the "stomatologists" in the Latin countries.

In the evolution of dentistry as a profession, within the last century, two opposing tendencies have appeared. American dentistry, by its own initiative and determination, developed into a completely independent branch of the public health service, disengaging its educational and professional ties from general medicine. European dentistry, with a few exceptions, attempted an amalgamation with the medical profession, including a fusion of dental and medical education. This resulted in the establishment of a new medical specialty, stomatology, with but little emphasis on the technical phases of dentistry.

The creation of the Central European terms "medecin-dentiste," or "Zahnarzt," although ideally conceived as far as the coordination between the dental and medical professions is concerned, appears to have been burdened from the beginning by the semimedical status of an academic dependence of the dental faculty on the medical faculty simultaneously with a profes-

sional competition between the highly educated dentist and the rather inadequately trained dental technician.

The practice of dental medicine, however, which now is universally recognized as being of equal importance with the prosthetic phase of dentistry, will provide the international dental profession with the background necessary to take an independent and respected position within the domain of the healing arts.

Disinfection of the hands of surgeons and dentists (Zur chirurgischen Händedesinfektion)

Theo Lammers. *München. med. Wschr.* 98:94
Jan. 20, 1956

Manufacturers of detergents containing hexachlorophene claim that a single application of their products (usually in the form of a liquid soap) has absolute bactericidal effects. These claims have been repeated in reports of various authors appearing in medical and dental literature.

At the Institute for Hygiene of the University of Mainz, Germany, serial tests have established that detergents containing hexachlorophene are of limited value in medical and dental practice because, when used in washing processes before and after surgical interventions, no microorganism on the hands of the operating surgeon or dentist was destroyed. Such detergents, however, are not harmful to the physician, the dentist or the patient.

When such preparations are used regularly and repeatedly, a bacteriostatic film develops covering the hands and feigns a diminution of the microorganisms. These soaps containing hexachlorophene are no more effective than a good neutral soap or any other cleansing preparation not containing specific bactericidal substances.

It is required of disinfectants that they destroy definitely all test microbes, so that on strictest examination, no living germs are detectable.

It has been established that germs which were exposed to disinfectants, and which did not propagate on postculture mediums, redeveloped in the organisms of test animals.

Basic science



Physiology

Bone changes associated with tooth movement: a histological study of the effect of force in the rabbit, guinea pig and rat

Elsdon Storey. *Austral.J.Den.* 59:147-161
June 1955

To study the bone changes associated with tooth movement in the rabbit, guinea pig and rat, a simple experimental technic has been developed wherein helical torsion springs are applied to the incisor teeth in order to move them laterally. The springs consist of a number of loops of wire wound into a center coil and two free arms which are inserted into fine holes drilled through the crowns of the teeth.

Three different forces were applied to the teeth of the 200 animals used in the experiment, for a

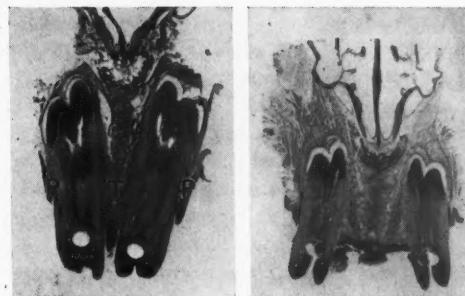


Figure 1 Photomicrographs of the incisor teeth of the female rabbit. When force is applied to the teeth in a lateral direction, the regions marked T are under tension and those marked P are under pressure. Left: Before tooth movement. Right: Moderate force (50 Gm.), seven days' tooth movement

constant time—seven days. There is an increased rate of tooth movement with increasing force in the rabbit and rat, but not the guinea pig, within the age range studied (approximately 6 to 12 weeks). The tooth movement in the rabbit and rat is associated with a lateral movement of the premaxillary bones and the continued formation of bone from the sutural connective tissue which maintains the width of the suture. There is an

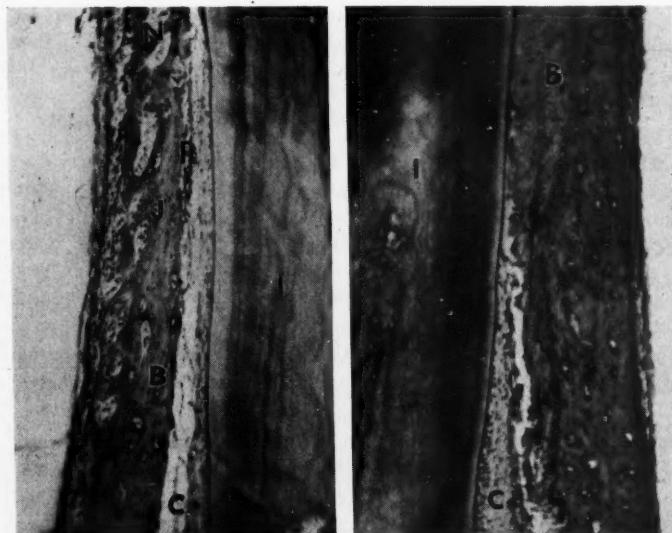


Figure 2 Pressure side of guinea pig showing increased amount of bone resorption with light force. N is new bone; I, incisor tooth; B, bone, lateral alveolar process; R, resorption of bone; C, connective tissue of periodontal membrane, and J, junction of old and new bone. Left: Light force. Right: Heavy force

optimum range of force required to produce a maximum rate of growth of mature bone, the range differing in each species studied. In the heavy range of force, well formed mature bone is laid down. Differences in the results obtained in previous investigations can be explained by the inability to control such experimental variables as force, time, age, sex and species.

Results of the experiments support the contention that there is an optimum range of force which can be used safely in orthodontic practice. The low range of force is preferable as least damage to tissues results. This range of force is at a different level in different species, but has essentially the same characteristics, that is, a slow rate of tooth movement with formation of mature bone trabeculae on both the "tension" and "pressure" sides. This paper is the first of a series concerned with the effect of variables such as force, time, age, sex and administered hormones on the histological changes associated with mechanically produced tooth movement.

**Studies on the investigation
of physiological factors for the growth
of tooth. Part I. On the normal growth
of tooth of the rabbit**

Kei Suzuki. *J. Japan Stomat. Soc.* 23:25-34
March 1956

The growth of the incisor in the rabbit was measured under several experimental conditions, and the following observations were made:

1. The rabbit incisor erupts at a rate of from 1.05 to 3.55 mm. per day in its normal condition.
2. The lower incisor erupts faster than the upper incisor.
3. No sex differences were observed.
4. The speed of eruption differs on the left and right sides.
5. When the crown is cut, eruption is accelerated.
6. Removal of occlusal stress accelerates eruption.
7. Removal of pulp retards eruption.
8. The pulp may transmit external stimulation to the odontoblasts and change the speed of eruption.

Pain in human teeth caused by temperature variations and heat conduction

(Temperaturschmerz und Wärmeleitung im menschlichen Zahn)

Herbert Hensel and Gerlinde Mann. *Stoma* 9:76-85 April-June 1956

The staff of the Physiologic Institute of the University of Marburg on the Lahn, Germany, recently examined the pain phenomena occurring in human teeth after temperature changes and heat conduction.

In preliminary tests, extracted incisors were exposed to temperature and heat stimuli through silver contact plates which covered the teeth surfaces. Simultaneously, the temperature changes occurring inside the teeth were recorded by thermoelectric thermometers. The thermometric conduction figure (in the average) was computed as being 0.018 sq. cm. per second.

Thermoelectric measurements on incisors in the mouths of patients revealed that the threshold of pain was reached when the dentinoenamel border had been heated to a temperature of 47.7° C., or when it had been cooled suddenly to a temperature of 26.4° C. Under equal circumstances, no significant changes occurred in the pulp.

These examinations showed that the primary temperature pain originates in the dentin. Under conditions of extreme temperature stimuli, however, the pulp also can be affected.

**Urinary excretion of fluoride
following defluoridation of a water supply**

R. C. Likins, F. J. McClure and A. C. Steere. *Pub. Health Rep.* 71:217-220 March 1956

The relationship of age to the rate of mobilization of fluoride in a human population group exposed to an excessive amount (8 ppm) of water-borne fluoride was investigated.

For more than 50 years before defluoridation was begun on March 10, 1952, the communal water supply of Bartlett, Texas, contained 8 ppm fluoride. Since that date the fluoride in the water has been maintained at approximately 1 ppm.

One hundred and sixteen white males who had used the Bartlett water supply for at least two

years immediately prior to defluoridation and who were currently drinking Bartlett water composed the study population.

The urinary excretion of fluoride was determined in children, aged 7 to 16 years, and in men, aged 20 years and older. During a period of 27 months the concentration of fluoride in urine specimens decreased from 6 to 8 ppm to approximately 2 ppm. The urinary fluoride values during the period were considerably higher than would be expected for a corresponding group with no prior exposure to high levels of fluoride. These values indicated that previously stored fluoride was being mobilized. There was no apparent relation between age and urinary fluoride excretion within either group. The extent of mobilization, however, appeared to be greater in children than in adults.

It seems probable that exchange is the principal mechanism concerned in the mobilization of fluoride from the mature skeleton. On this basis the initial rapid decrease in the urinary concentration of fluoride in adults presumably reflects the loss of readily exchangeable, surface-bound fluoride, whereas the somewhat less precipitous drop in concentration in children may be the consequence of the progressive liberation of fluoride from bone through resorptive activity.

Geminate tooth formation: schizodontia and synodontia (Beschouwingen over synodontie)

Th. E. de Jonge. *Tschr.tandheelk.* 62:828-834
Dec. 1955

Geminate tooth formation occurs in two distinct types: (1) "schizodontia" and (2) "synodontia." These terms express the different evolutionary origin of both forms.

Schizodontia is the term applied to geminate teeth which originate by a division of the tooth anlage into a mesial and a distal component. This form is morphologically progressive, and is manifested in a permanent developmental series occurring predominantly in the anterior teeth of the upper jaw, and infrequently in the mandible. In schizodontia, the final developmental phase is reached by the eruption of two completely sepa-

rated teeth. The isolated geminate tooth then has been replaced by two independent teeth. Schizodontia seldom appears in the deciduous dentition; if it occurs, however, the same difference in frequency between upper and lower jaw can be observed.

Synodontia is the term applied to geminate teeth which are formed by a complete or partial inability of two adjacent dental germs to retain their individuality. This form of twin formation, especially when appearing in mandibular incisors, shows an extreme degree of isomorphism with corresponding instances of schizodontia. The synodontic condition, however, is in contrast to that of schizodontia, because it appears primarily among anterior teeth of the deciduous dentition and to a far lesser degree among permanent anterior teeth.

The rarest form of synodontia is a synodontic twin formation in permanent lateral incisors or canines.

Physiologic considerations of dentine

Julian D. Boyd. *Report Seventeenth Ross Pediat.Res.Conf.* p. 75-78, 1956

The tooth can protect itself from adverse intraoral environmental conditions if proper homeostasis can be maintained; active caries is an evidence of suboptimal health of the body.

If a newly erupted tooth is placed in basic fuchsin, the dentin imbibes stain throughout its substance. In contrast, if an adult tooth is immersed in stain, the dentin tends to reject it. In some respects its physical properties have come to simulate those of enamel. It has become a hard tissue, a suitable protective covering for the pulp.

Soon after a tooth erupts the dentinal tubules begin to undergo sclerosis in certain areas of preference. These tubules, once they are sclerotic, no longer imbibe stain but stand out as relatively impervious tracts interposed between the enamel, which receives the shock of trauma, and the pulp chamber—barriers to transmission of the insult to the pulp.

The tooth is hung in a hammock. With each chewing, it is depressed into the hammock and, consequently, pressure is put on the fluids within

the pulp and the dentinal tubules. This pressure results in a tendency to spread the fluids throughout the whole substance. Although there is no circulation in the dentin, there is an alternate pressure effect that can circulate the fluids of the pulp throughout the dentin and from the dentin out through the enamel.

The tooth is a sieve. Molecules of considerable dimension can pass directly through the enamel into the dentinal fluid, and fluid from the pulp can pass out through the dentin and out through the apparently intact enamel. There is evidence that the tooth undergoes a sort of maturation after it erupts, and that eventually, as the individual reaches adulthood, the tooth, which is originally porous throughout its dentin, becomes sclerotic and hard.

If there is a break in the continuity of the enamel, an opportunity arises for ingress of harmful factors from the mouth into the dentin. When this threatens, the tubules tend to become sclerotic. If sclerosis is sufficient, the region will be sealed off, leaving a region of enamel caries and a potential region of dental caries, microscopically identifiable, but no true caries will result.

Hinge opening axis of the mandible

Ulf Posselt. *Acta odont.scandinav.* 14:49-63
June 1956

The question whether the mandible carries out hinge movement or whether during mouth opening the condyles shift forward from the very beginning, is still widely discussed. In human beings the mandible can carry out an opening movement to a distance of up to 20 mm. between the incisors without any forward gliding of the condyles. Unlike the habitual "natural" opening of the mouth, such a hinge movement is remarkably constant. Although it is most readily produced passively, it also can be reproduced actively with a certain amount of practice.

The axis of this movement was analyzed by means of profile roentgenograms, geometric constructions from profile roentgenograms, axial points recorded by means of kinematic facebow and checked by profile roentgenograms and by experiments in the gnatho-thesiometer.

Experiments carried out with these three different methods gave similar results. The (posterior) hinge opening and closing is a rotatory movement around a frontal axis passing through the condyles. This is true for an opening of about 20 mm.

The sources of error of the various methods are discussed and the results of the investigation are compared with those of other investigators.



Anthropology

Man's teeth

Brit.M.J. No.4984:111 July 14, 1956

The teeth of many types of mammals have conspicuous anatomic features which can be interpreted as having arisen, during evolution, as a result of selection and isolation acting to produce a mechanism adapted to cutting and grinding a particular type of food. The second upper premolar and first lower molar of carnivores form a shear for cutting bones, and their long and sharp canines are suitable for tearing flesh. Herbivores lack canine teeth, and their molars have a complex pattern of ridges which interlock with those of the corresponding teeth in the other jaw to make an efficient arrangement for chopping and grinding herbage.

In man the teeth are uncomplicated organs for biting and grinding. Their anatomic features give little information about the type of food to which early man was accustomed. On the other hand, the degree to which the tooth crown is worn down enables some inferences to be drawn about the texture of the food that is normally eaten. The diet of many monkeys and apes contains much abrasive material which wears away the enamel to expose the underlying dentin. The teeth of many types of man, extending from prehistoric times and including some primitive groups, wear down in much the same way as do those of monkeys and apes. Wear is not pronounced in the teeth of civilized man, and it seems reasonable therefore to infer that the diet of primitive man contained far more abrasive material than is customary in modern civilized races.

**The degree of attrition
of the deciduous teeth
and first permanent molars of primitive
and urbanised Greenland natives**

T. G. H. Davies and P. O. Pedersen. *Brit. D.J.*
99:35-43 July 19, 1955

The pronounced dental attrition displayed by the Eskimo of Alaska, Canada and Greenland has impressed many visitors and has been referred to in anthropological literature. In 1935 and 1937 one of the authors surveyed the dental conditions in West and East Greenland, recording the degree of occlusal and incisal attrition of each tooth included in his studies. The present paper analyzes the observations concerning the degree of attrition of deciduous teeth and first permanent molars in East and West Greenland and discusses the correlation between the severity of the attrition and the dietary habits in these areas. Four groups of communities are considered, in a sequence indicating an increasing degree of urbanization.

The analysis of attrition of deciduous teeth was confined to children between the ages of two and ten years. Since the first permanent molars were present in the mouths of the older children considered, the degree of attrition of those permanent teeth was analyzed as a supplement to the first study.

Attrition increases with increasing age and decreases with increasing urbanization. Among possible causes of attrition are the following: Many of the food items in the original Eskimo diet require strenuous, prolonged chewing; Eskimos use their teeth for many types of work; when performing heavy physical exercise, they often clench their teeth firmly and probably also grind them; the Eskimo meat-fat diet may be responsible for decreased hardness of the teeth.

Although the drinking water in Greenland is generally low in fluorine, the native food, derived mainly from the sea, contains considerable amounts. A fluorine factor is not likely to contribute appreciably, if at all, to the attrition of the deciduous teeth. The heavy wear of the teeth of the Eskimo subsisting on the original native diet probably results from a combination of causes.

Although it is not within the scope of this paper to present data on the largely inverse ratio of oc-

clusal dental caries to occlusal attrition, it is mentioned that in 1937 caries was a very rare disease in the village of East Greenland. The majority of the carious lesions observed in the permanent teeth were found in unworn occlusal surfaces of third molars. Of 13,308 permanent teeth examined in the villages of East Greenland, only 68 surfaces were carious.

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Biophysics

**Radiation with electromagnetic waves
and microwaves in dental practice**

(Die Therapie von Zahn- und Kieferkrankheiten mit Hilfe von elektromagnetischen Wellen, insbesondere Mikrowellen)

H. Alm. *Zahnärztl. Welt & Reform* 11/57:140
June 10, 1956

The most important source for electromagnetic waves is the sun. Without solar light and heat, no organic life would be possible on the earth. About 45 per cent of the sun's rays that reach the earth are infrared rays, and the spectral region of these beams makes radiation and heating of deeper strata possible.

For radiation therapy in dental practice, the most favorable wavelength to produce deep effects lies between 0.7 and 1.4 microns. The depth penetration is between 5 and 15 mm.

In any heat radiation apparatus containing incandescent lamps, infrared rays are used. Electric nonlighting heating sources such as heating elements, radiators and diathermic generators also emit infrared rays.

To obtain maximum penetration, visible rays (by using red filters) or long wave rays (by using water filters) are used. All these infrared rays produce heating effects which dilate the vessels and stimulate nerve and cell activity.

Electromagnetic waves used in dental practice are produced by high frequency tube generators. Their wavelengths range between 1 mm. and 1 meter or between 1 cm. and 1 meter.

With infrared short waves, it is possible to

radiate all parts of the body which can be placed between the cathodes; therefore, all parts of the oral cavity can be radiated.

Experience with radar, gained during World War II, made possible the development of a new and more intensive treatment technic, microwave therapy. For physical reasons, customary condensator fields are unsuited for microwave application. The energy of microwaves must be conducted from the generator over coaxial cables to the radiator; the heating effects are produced through concave mirrors. The patient is not placed inside the electric circle but remains outside. In regard to refraction and absorption, microwaves have pseudo-optical properties, resembling those of infrared light.

Microwaves are produced by specially constructed magnetrons.

before and after cystectomy. After an observation period of 8 days, 14 days, 4 weeks, 3 months, 6 months and 1 year subsequent to cystectomy, the following data were obtained: Group 1 (after 8 days), no significant changes in the cholesterol blood level; Group 2 (after 14 days), increased cholesterol values returned to normal (sometimes subnormal) and increased again; Group 3 (after four weeks), normal cholesterol values increased to a maximum, and returned slowly to normal; Group 4 (after three months), normal cholesterol values increased to a maximum, and remained at a level above normal; Group 5 (after six months), normal or even subnormal cholesterol values were maintained temporarily but increased later, and Group 6 (after one year), increased cholesterol values remained high, and only slight fluctuations were observable.

The comparison between data obtained by use of serumal cholesterol and cholesterol ester reveals that the curves are almost identical, and no significant deviation has been determined.

Pathogenic relations between cysts of the jaws and alterations of cutaneous structures remain to be established by further research.

▼
Biochemistry

**The cholesterol blood level
after cystectomy in the region of the jaws**
(Über das Verhalten des Cholesterinspiegels
im Blut nach operativer Behandlung
von Kieferzysten)

Th. Kirsch. *Stoma* 9:115-124 April-June 1956

The relations existing between the cholesterol blood level and the cholesterol contents in cysts of the jaws, have been examined by the staff of the Dental Institute of the University of Heidelberg, Germany.

It has been established that (1) the presence of cysts of the jaws increases the cholesterol content of the blood; (2) the cholesterol content in cystic fluids is higher than that of the blood, and (3) the increase of cholesterol in both the blood and the cystic fluids depends on the activity of cholesterol ester.

In contrast to previous examinations in which cholesterol in serumal form only had been used, in the recent investigation cholesterol ester also was used. The cholesterol metabolism in 43 patients with cysts of the jaws was determined

▼
Pathology

**Neurologic and prosthetic effects
of a shrapnel fragment remaining in
the region of the upper jaw**
(Aussergewöhnliche Lokalisation eines
Kiefersteckschusses und seine neurologischen und
zahnprothetischen Auswirkungen)

Th. Port. *Zahnärztl. Welt & Reform*
11/57:160-161 June 25, 1956

A patient, now 47 years old, had been wounded seriously by a shrapnel explosion during World War II. After surgery, one shell fragment remained immobilized in the left palatine velum.

As a result of either the severe injury or the presence of a foreign body in a sensitive region, headache radiating from the occiput to the tongue and the jaws, temporary blindness, hearing de-

fects, trismus, paralysis and swellings of the left half of the face, and increased salivation had occurred periodically. The duration and vehemence of the attacks, which lasted from 20 to 30 minutes, were influenced by excitement, change of weather or sickness. During the attacks, however, there were no convulsions involving the eyes, head or body, no tongue biting and no involuntary passage of urine or excrement.

Roentgenographic examination revealed a distinct cloudiness in the region of the maxillary sinus with a chronic inflammation around the serrated metal fragment in the region of the palatine velum. The upper point of the shrapnel splinter touched the wing of the sphenoid bone and its lower end reached the pterygoid process.

The neurologic examination revealed scar formation on the nasolabial fold where the shrapnel fragment had entered. The mouth could only be opened about 2 cm. A decrease in the power to see, hear and smell, hyperesthesia, hyperalgesia combined with dysesthesia, thermohyperesthesia and thermalgesia in the region of the left side of the face were among the symptoms observed. In addition the patient was unable to breathe through the left nostril.

Physiologic examination indicated a decrease in intellect and memory. Mental depression and irritability obviously were caused by the frequent and painful attacks.

The encephalographic examination showed no injury to the brain and no decrease in the cerebral activity.

The upper jaw was missing all teeth except the healthy cuspids. Although all teeth were present in the mandible, progressive periodontosis with loosening of the anterior teeth and calculus formation on bicuspids and molars (caused by the inability to masticate properly) existed.

Extraction of several teeth followed by a prosthetic restoration of the mandible was indicated, and was accomplished without difficulty.

A complete upper denture, however, could not be inserted because even the slightest pressure elicited painful reactions as a result of the presence of the shrapnel splinter.

The only feasible solution was the construction of a six-tooth bridge in which the strong cuspids were used as abutments.

Although a satisfactory masticatory function

was not achieved, the patient was able to cut his food into small pieces which he could digest. His esthetic appearance was improved.

Should the patient consent later to a surgical elimination of the shrapnel fragment, and the postoperative result be favorable, a complete prosthetic restoration could be obtained without significant difficulties.

Scleroderma affecting the masticatory apparatus

James E. Chipps and Victor R. Hirschmann.
U.S. Armed Forces M.J. 7:1209-1213 Aug. 1956

Scleroderma is of interest to dentists because of occasional reports of gingival and periodontal involvement. The disease usually begins in adult life after development of the masticatory apparatus. A case is reported in which the disease began in childhood and affected the development of the oral structure.

A seven year old girl manifested a chronic atrophic disease of the lower right side of the face. At the age of 15 months the patient had fallen from a chair, striking the right side of the face. Two weeks later, a bluish discoloration appeared over the right ramus of the mandible and the submandibular region. In the next three years the area slowly extended to involve most of the lower right side of the face. A brownish pigmentation appeared which slowly worsened until age four and a half, then slowly improved. At age six and a half, induration of the right side of the floor of the mouth and missing teeth were noted.

Roentgenograms revealed retarded development of the right ramus of the mandible. A skin biopsy was reported as histologically compatible with a diagnosis of scleroderma. Throughout the period rampant caries was noted, and several deciduous teeth had been extracted. The dermatologist referred the patient for dental consultation.

The entire lower half of the right side of the face was less developed than the left. The right ear was about a third smaller than the left and turned slightly outward. Both lips were thin and compressed against the dental arches on the right. The right half of the mandible was smaller than the left.

Intraorally the floor of the right side of the mouth was thin and indurated. The right submaxillary duct was atrophied and there was no evidence of sublingual or submaxillary gland function. The right parotid duct, however, was patent and discharging saliva. The right half of the tongue was atrophied. The mucosa throughout the right side was thickened. Six deciduous molars had been extracted. There was a pronounced distoocclusion and individual malposition of the teeth. Caries was pronounced. The eruption of teeth appeared normal chronologically.

A posteroanterior roentgenogram showed a pronounced mandibular asymmetry. Lateral roentgenograms showed that the dental follicles in the affected right side occupied essentially the entire vertical dimensions of the medullary bone. The stage of follicular development, however, appeared symmetrical in both right and left sides.

In the year that the patient was watched the disease appeared inactive. Growth of the mandible was noted on both sides. Pigmentation of the skin cleared considerably. The patient received dental restorations for caries and space maintainers to compensate for the loss of deciduous teeth. The permanent bicuspids erupted bilaterally. Contact with the patient was lost because of a military transfer of the parent.

Gingivodental lesions and pregnancy (Lesões gengivo-dentárias e gestação)

Antonio Paul. *J. Estomat.*, Lisbon 1:9-16
Dec. 1955-Jan. 1956

A survey of 3,310 pregnant women and the study of 224 published papers lead to the following conclusions:

1. Pregnancy is not a cause of dental decay, nor even of abnormal decalcification of teeth.
2. Normal pregnancy produces body modifications which include alterations of the teeth and gingiva, but they are rarely serious. Slight clinical symptoms may appear, however, such as gingival bleeding, toothache, and so forth, which indicate the existence of such modifications.
3. The body modifications that occur during pregnancy and menstruation demand frequent

examinations and oral attention. If a woman should need dental health care under these conditions, the dentist should adopt, as far as possible, conservative procedures. Extractions and oral surgical procedures can be performed, however, under normal conditions, without unfavorable general reactions occurring, but it is preferable to do them between the second and seventh month of pregnancy. If it becomes necessary to operate during the last months of pregnancy it is wise to test for coagulation and bleeding time. Surgery should be preceded by necessary precautions to avoid infection (antibiotics, vitamins).

4. In all institutions that give prenatal attention there should be an oral prophylaxis department, so that women can be examined at the commencement of pregnancy. Then oral disease can be treated, and the elimination of foci of infection will prevent puerperal complications which are so frequently serious.

Diagnosis of the condition of the tongue in dental practice (Zungendiagnostik für die Praxis des Zahnarztes)

K. F. Hoffmann. *Zahnärztl. Welt & Reform*
11/57:183-184 July 10, 1956

The appearance and condition of the human tongue has always been recognized as an important part of clinical diagnosis. In the second century A.D., Galen, the Greek physician, wrote: "The condition of the tongue reveals to the attentive observer the state of general health, especially that of the hard parts, fluids and juices, masticatory and digestive organs and the lungs of the human body."

A. Strobel (1956) stated that the tongue can be regarded as the window of the digestive system through which diagnostic observation of occurring alterations and disturbances can be made.

H. Krauhs (1949) described the tongue as the mirror of the stomach's condition.

M. Bürger (1951) advised physicians and dentists to observe carefully the form and shape, the coloration, the coating and the flexibility of the tongue because they will reveal symptoms of pathologic events, reactions and processes of the entire organism.

For an evaluation of pathologic symptoms of the tongue, the following instructions will be valuable: (1) a clear tongue indicates an undisturbed digestive tract; (2) a dry tongue often is a sign of abnormally high temperature or dehydration; (3) an enlarged tongue leads to the diagnosis of acromegalia or to the suspicion of focal infection; (4) a tongue reduced in size often is a sign of bulbar paralysis; (5) a trembling tongue is one of the characteristics of neuropathy or psychopathy; (6) lesions on the tongue surface can be caused by tuberculosis or syphilis; (7) a cream-colored coating may indicate gastritis; (8) a swollen tongue, showing tooth impression marks on its edges and a grey coating indicates hypertrophic or mycotic gastritis; (9) a brownish coating often is a sign of hepatic disease or biliary disturbance; (10) a firm coating, pallor and edema lead to the diagnosis of uremia; (11) a raspberry-red tongue points to scarlet fever; (12) a clear but deep red tongue often is a sign of tuberculosis; (13) a pallid and constantly wet tongue, after having been coated and dry, may lead to the discovery of gastric hemorrhage; (14) a dry and black tongue indicates typhoid fever; (15) a changing coloration, alternating from white to black, is a sign of aortic insufficiency; (16) a dry tongue with dark-red stripes through the middle is one of the characteristics of enteritis or muscular spasm; (17) a smooth atrophy of the surface and edges (Hunter's glossitis) points to pernicious anemia; (18) a dry and cracked tongue indicates diabetes; (19) a dry tongue with white and slimy coating, petechias and pustules, indicates dystonia of the vagus nerve or chronic gastritis or enteritis; (20) a dry tongue, brown in its center, the edges wet and red, points to colitis; (21) coating on the tip with bright-red edges indicates disturbances in the acid-forming metabolism; (22) a dry tongue, constantly wet on its tip, white-colored but not coated, is a symptom of rheumatic processes in the intestines; (23) a dry tongue, its tip looking scalded and with a thick creamy-colored coating, leads to the diagnosis of scrofulous diathesis; (24) a dry tongue, with its base glutinously coated, is a sign of ulcerative processes in the intestinal canal; (25) a constantly dry and cracked tongue is one of the characteristics of inflammation of the mucous lining of the stomach, probably caused by poisons; (26)

a yellow coating with tooth impression marks on the edges may indicate hemolytic jaundice and afflictions of the liver parenchyma; (27) a blue coating indicates typhoid fever or bacillary dysentery; (28) a cobblestone tongue indicates leukoplakia; (29) an entirely black tongue is a sign of cholera; (30) a magenta-colored tongue is seen in riboflavin deficiency; (31) an extremely clean tongue may indicate the late stages of pellagra, and (32) the so-called geographic tongue, a rare inflammation of subacute or chronic character, is a disease and not a symptom.

**Dental focal infection
and preventive dentistry** (L'infection focale
stomatogène dans le cadre de la médecine
préventive)

Th. C. Afendulis and O. A. Louridis,
Athens, Greece. *Rev. mens. suisse odont.*
66:584-586 June 1956

The many theories on dental focal infection show a surprising inconsistency. At present, it has been established that oral infection has a definite effect on general health and that systemic diseases, mainly infectious diseases, blood dyscrasias, and nutritional, endocrinous and developmental disturbances, have definite effects on the teeth. It is also recognized by many authors that alterations in oral structures are often the first indications of subclinical disease processes occurring in other parts of the human organism.

Clinical examinations of patients afflicted with dental focal infection have been undertaken at the dental department of the Medical Institute of the University of Athens, Greece. These examinations resulted in the conclusion that dental focal infection, if treated at the moment of its primary symptomatic manifestation, can be healed completely by preventive procedures. Only in instances of complication and after conservative methods fail to obtain the desired results, more radical techniques should be applied but with complete oral antisepsis and accompanied by preventive and antibiotic therapy.

It is emphasized that dentists not only should treat the oral diseases but also should aid in the diagnosis of general systemic conditions often affiliated with dental focal infection.

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Histology

Electron microscopic and chemical examinations of isolable parts of the odontoblastic processes in human teeth
(Elektronenmikroskopische und chemische Untersuchungen über die isolierbaren Teile der Odontoblastenfortsätze menschlicher Zähne)

Ingrid Nickel. *Deut.zahnärztl.Zschr.* 11:485-490
May 1, 1956

The odontoblastic processes in the dentin caniculi of human teeth possess a high degree of resistance to acids and alkalis.

Although the chemical synthesis of odontoblasts and their processes still is not determined, it can be assumed that they are not of a mineral nature.

The dentin consists of inorganic substances and of a relatively significant amount of organic substances, mainly proteins such as soluble protein, collagen and keratin. Keratin forms from 20 to 30 per cent of the organic substance; whether its structural elements are united morphologically is as yet not established.

At the Dental Institute of the University of Frankfurt am Main, Germany, chemical and morphologic examinations of dentin, odontoblasts and odontoblastic processes were undertaken. From the dentinal caniculi, the long threadlike odontoblastic processes, extending from the dentinal tubules to the dentinoenamel junction, were examined chemically and by electron microscope. By repeated treatment with diluted hydrochloric acid, the dentin was decalcified. Collagen and soluble protein were eliminated by multiple heating in autoclaves. The remaining isolated material (about 2 per cent of the organic substance) was found by electron microscopy to be identical with the substance of the odontoblastic processes.

Chemical examination of the threadlike odontoblastic processes revealed, as expected, a sulfurous protein which was soluble only with difficulty in acid or alkali. When boiled in 30 per cent alkali, it was soluble. After an extended treatment

with four times the normal hydrochloric acid for 40 hours, only a few greatly altered and partially dissolved threads remained. Paper chromatograms of hydrolysates of autoclaved, isolated protein showed no significant changes. With papain and hydrocyanic acid, a partial recombination was possible. The findings confirmed the surmise that the substances isolated are identical with keratin.

To establish whether the proteins of the odontoblastic processes also belong to the keratin group, the substance was analyzed and compared with the basic amino acids—arginine, histidine and lysine—which all possess mol conditions similar to those of keratin. The gram-molecule values of those amino acids, however, were dissimilar to those of the already established keratins.

Because keratin never has been established in mesodermal tissues, this keratin-resembling protein probably is another, as yet undetermined, scleroprotein.

Organic constituents of enamel

Lloyd E. Webster. *Contact Point* 34:247-250
May 1956

For years the enamel of teeth was considered an inert shell of lime salts, a passive prey to acids formed by bacterial fermentation of carbohydrates in the oral environment. Much caries research was based on this concept.

Recent studies of the organic components of enamel reveal that the enamel is permeated by a delicate organic framework. It is likely that the organic matrix of enamel is involved at an early stage in caries.

Each prism unit of enamel is about 5 microns in diameter; about 10,000,000 prisms are required to build the enamel of a molar tooth. When the minerals are removed, the prism core looks empty under the ordinary microscope. The space between the prisms where the organic matter is concentrated is only a micron or so wide; hence the information obtainable with the ordinary light microscope is limited.

The electron microscope has revealed more minute organic components not previously thought to exist. It has revealed that the core of the prism is not wholly inorganic but is permeated by nu-

merous delicate organic fibrils which surround what appear to be individual inorganic crystals. Between the prism sheaths are minute crystals, each surrounded by this fibrillar organic framework.

The inorganic enamel crystals that build the prisms apparently are not stacked up against each other like so many pencils, one hanging on the next. Instead, each prism is separated from the next by organic matter. This organic bond must serve an important function, as the combined inorganic and organic units are far stronger than is each separately.

The electron microscope shows that the proteins of bone, cementum and dentin have submicroscopic striation characteristics of collagen. Information about the evolution of the teeth, the embryologic origin of the enamel from epithelial cells, and recent histologic findings point to the conclusion that the bulk of the organic framework of enamel is a keratin-like substance.

In addition to the fibrous protein framework, it appears that there is a small amount of dispersed ground substance, a carbohydrate-protein complex which may act as a coating of the fibers and serve as a bond between the inorganic matter.

Although there has been much research on the organic content of enamel, results have varied according to the various technics used.

**Evaluation of dental caries in rats:
microscopic studies of nondecalcified
sections of molars** (Die Bewertung der
Zahnkaries der Ratte an nicht entkalkten
Schnitten der Molaren)

L. M. Dalerup and B. C. P. Jansen, Amsterdam.
Internat. Zschr. Vitamin Forsch., Bern 26:103-106
March 1956

Evaluation of dental caries in rats has been achieved by systematic microscopic studies of nondecalcified sections of rat molars. The micrograms, 40 times enlarged, reveal the presence of local predisposing factors such as enamel defects, formation of pits and fissures probably caused by embryonal defects in tooth development, and various lesions differing in form, size and location.

Five essentials for the development of caries in

rats were determined: (1) a specific susceptibility to caries in certain strains; (2) the presence of microorganisms in the oral cavity which produce acids but are able to survive in acid matter; (3) the capacity of bacteria to produce bacterial enzymes which degrade simple saccharine matter; (4) the presence of fermentable carbohydrates in the oral cavity and (5) the presence of bacterial plaques adherent to the surfaces of the molars.

The microscopic method can be transferred easily to the examination of carious processes in man, especially in instances of early caries.

▼
Bacteriology

**Influence of endogenous factors on the
microbiologic equilibrium in the oral cavity**
(L'influence des facteurs endogènes sur
l'équilibre microbiologique de la cavité buccale)

Th. Lammers. *Zahnärztl. Praxis* 7:4 June 1, 1956

Development and multiplication of oral bacteria differ greatly in individual patients. Under present-day nutritional conditions, the particular characteristics of microorganisms invading the oral cavity depend on the acid base equilibrium in the saliva. This balance, therefore, is responsible for a disposition to dental caries, and it is controlled by endogenous factors.

Sympatheticotonia of the vegetative nervous system results in a decrease in salivary alkalinity, and parasympatheticotonia causes an increase. The alkalinity of saliva, its buffering power against acids, limits the effectiveness of exogenous caries-producing factors by influencing the composition of microorganisms of the oral flora, and limits the influence of these factors on caries disposition.

The combination and interrelation of endogenous, exogenous and localized factors result in the characteristic properties of the microbial population in the oral cavity.

An analysis of all those factors, and especially an analysis of the oral flora, will permit a correct evaluation of the endogenous susceptibility to caries in individual patients.

Preventive and public health dentistry



Nutrition

Research in dental caries susceptibility

L. Bavetta. *J. South. California D.A.* 24:29-31
July 1956

At the University of Southern California a series of experiments is in progress to determine if a nutritional disturbance early in life may lead to increased susceptibility to dental decay in later life. The effects of total and partial deficiencies of amino acids and tryptophan in particular are being studied. Such effects are not too dissimilar from those resulting from a faulty protein intake. The effects of such deficiencies only during the critical periods of tooth development—in the rat, the period of gestation and lactation—are being studied.

Considerations in planning an experimental diet include the quality and quantity of protein, the fat, carbohydrate, mineral and vitamin content. Although it is frequently assumed that the nature of the carbohydrate is immaterial in experimental diets, the experiments indicate that the type of carbohydrate is an important factor when only marginal levels of tryptophan supplementation are used. At suboptimal levels of tryptophan supplementation, better growth was obtained with dextrin than with sucrose as the carbohydrate.

Hyperthyroidism was used to produce or accentuate dietary deficiencies in the animals. The tryptophan requirement of the rat is increased in the hyperthyroid state. The hyperthyroid animals maintained on suboptimal amounts of tryptophan supplementation showed an increased inhibition of endochondral and periosteal bone formation, and pronounced osteoporosis of the alveolar bone. The injection of a potent growth hormone into the animals failed to promote a weight increment during the ten day experimental period.

Histologically, however, significant differences were observed in the animals receiving such a growth hormone and in those not receiving the hormone. The epiphyseal plate of the animals receiving the growth hormone was almost doubled in width as compared to the controls. There was also an increased deposition of bone in both the long bones and the alveolar bone.

Rats fed suboptimal amounts of tryptophan failed to respond to growth hormone treatment by an increment of body weight, but such treatment did stimulate bone growth. These observations suggest that under conditions of limited intake of essential nutrients, the growth hormone exerts selective effects in favor of bone development.

A number of experiments are in progress with rats whose mothers were placed on diets with various levels of tryptophan deficiencies either during part of the gestation or the lactation periods.

The food habits and dental status of some Connecticut children

Martha Potgieter, Ellen H. Morse, F. M. Erlenbach and Ruth Dall. *J.D.Res.* 35:638-644 Aug. 1956

The dental status of 864 Connecticut children in grades five to eight was studied in relation to the adequacy of their diets, as determined from seven day food intake records kept by the children.

The average number of DMF teeth was slightly higher in these children at ages 14 and 15 than in Connecticut children of the same age reported in 1944.

There was no difference between the DMF rate for boys (8.1) and that for girls (8.0). The rural children had a slightly lower average DMF rate (7.1) than the city children (9.1).

The children with the better diets (rated according to the "National Food Guide" of the United States Department of Agriculture) had lower DMF rates, on the average. A higher intake of fruits and vegetables also was associated with a lower DMF rate.

There was a pronounced and consistent drop in DMF rate with an increase in the number of

cups of milk consumed, from an average of 10.65 DMF teeth for those drinking less than one cup of milk a day to 5.95 for those drinking 4.1 to 5.0 cups a day. Those drinking over five cups a day had a slightly higher average of dental decay (7.12 DMF teeth).

Only a slight positive relationship was noted between DMF rate and between-meal snacks; likewise, between DMF rate and total consumption of candy and soft drinks. The completeness and reliability of the children's records perhaps may be questioned.

Twenty-five years of caries research in Switzerland (Vingt-cinq ans de recherches sur la carie dentaire en Suisse)

Adolf Roos. *Rev.mens.suisse odont.* 66:491-518 May 1956

Caries research on a scientific basis in Switzerland started 25 years ago. In the international dental literature, the work of Swiss authors on caries represents one of the most accurate and reliable records existing today.

The caries condition of people living in remote Alpine villages has been evaluated in relation to the nutrition. Comparisons have been made between the past and the present, and the conclusions formed represent valid proofs of the links connecting nutrition to caries incidence.

The fact that the population of many mountain regions recently has changed from their natural thrifty economy to luxury has also radically changed the customary nutritional habits and has induced an enormous increase in caries frequency, especially observable in preschool and school children.

The results of wartime food rationing during five years and its relation to caries are demonstrated by the data compiled by Swiss dental school clinics. This wartime restriction of sugar and starches caused a decrease in caries frequency of 25 per cent in school children.

From the experiences of the prewar and post-war periods it can be concluded that the present high caries incidence in Switzerland has been caused by an unchecked consumption of sugar and sugar products.

Effect of the Kollath diet

(Wirkungen des Kollath-Frühstücks)

H. Warning. *Hippokrates, Stuttgart* 26:431-434 Sept. 15, 1955

The everyday diet consumed in most of the so-called civilized countries unquestionably is conducive to many deficiency diseases and dental caries. By an uninterrupted consumption of a more or less soft diet, containing comparatively large quantities of saccharoses and polysaccharides, a lack of vital biocatalytic substances is created. The development of the so-called civilization diseases, mainly caries, is promoted.

The anticariogenic Kollath diet consists of from 40 to 70 Gm. of coarse-grained (unrefined) wheat which is soaked in water for at least 12 hours. Curdled milk or yoghurt and shredded apples or other fruits then are added. This diet is designed mainly for breakfast but it can be extended to lunch and dinner.

Recently more than 100 persons who had consumed the Kollath diet regularly, and for at least one year, were examined. A decrease in caries frequency and a disappearance of previously existing deficiency diseases (avitaminosis, beriberi, scurvy or pellagra) have been observed.

Vitamin B₆ deficiency in the Rhesus monkey, with particular reference to the occurrence of arteriosclerosis, dental caries, and hepatic cirrhosis

James F. Rinehart and Louis D. Greenberg. *Am.J.Clin.Nutrit.* 4:318-328 July-Aug. 1956

During the past six years, extensive studies of pyridoxine (vitamin B₆) deficiency in the Rhesus monkey have revealed pathologic alterations which suggest that deficiency of pyridoxine may be important in the pathogenesis of human disease. Some 40 animals have been studied at the University of California School of Medicine. The animals were maintained on an essentially synthetic diet fed in tablet form containing 73 per cent sucrose, 18 per cent vitamin-free casein, 2 per cent corn oil and the essential vitamins and minerals.

Three major pathologic changes develop in

pyridoxine deficiency in the Rhesus monkey: (1) degenerative changes in arteries; (2) dental caries and (3) fatty metamorphosis in the liver, often with cirrhosis.

In the short-term experiments, little or no effect of pyridoxine deficiency was manifest in the teeth of the animals. In those which had been maintained in the deficient state for periods of two years or longer, the frequent occurrence of caries became evident, and in some animals was striking.

In eight control animals 213 teeth were available for study. Caries occurred in 34 teeth, an incidence of 16 per cent. In five animals subjected to equally prolonged deficiency of vitamins other than pyridoxine, 130 teeth were available for study; 12 were carious, an incidence of 9 per cent. In seven animals subjected to protracted pyridoxine deficiency, 149 teeth were available for study; 83, or 54 per cent, were carious.

Although it is not known whether man suffers from vitamin B₆ deficiency, it would be surprising if this were not so. Long-term suboptimal intake of pyridoxine may be a contributory factor in the pathogenesis of important human diseases, including dental caries.



Dental health education

A controlled study into the effect of dental health education on 1,539 school children in St. Albans

H. Colin David, G. J. Parfitt and P. M. C. James.
Brit. D.J. 100:354-356 June 19, 1956

A pilot survey was conducted to find out (1) the oral hygiene and dietary habits of a cross section of children in a typical urban community in the south of England, and (2) to assess the influence of dental health propaganda. The survey was conducted in St. Albans, with a population of 44,000 and a low fluoride water supply. Of 3,167 children available for the survey, 1,539 formed the experimental group and 1,628 acted as a control. Each group was made up of similar numbers of boys

and girls, drawn from three primary and two secondary schools.

At the start of the spring term in 1955 the children in both groups filled out a questionnaire on toothbrushing habits and the eating of sweets and biscuits between meals. The control group then proceeded on its normal term's work. The children in the experimental group were provided with toothbrushes and a term's supply of a standard tooth paste, and were subjected to an intensive propaganda campaign throughout the term. At the end of the spring term the experimental group was asked to fill in a modified second questionnaire which would indicate the propaganda effect of the campaign. Throughout the summer term, the experimental group reverted to the normal curriculum. At the end of the summer term both groups filled in the original questionnaire a second time. Both groups continued throughout the winter term with their normal curriculum, and at the end of the term filled in the original questionnaire a third time. The tabulated results show the following:

1. Before the campaign the standards of hygiene claimed were almost identical for the experimental and control group, and were reasonably good.
2. Throughout the survey girls of all ages consistently practiced a higher standard of oral hygiene than did boys. This suggests that a desire for a clean mouth is a basic feminine urge unaffected by puberty.
3. At the end of the spring term the standards had improved considerably among both boys and girls, although the results for the boys were still below those for the girls.
4. At the end of the summer term the standards claimed by the experimental group showed some deterioration but were still a good deal higher than the precampaign standards. In the control group there was little change over the whole period.
5. At the end of the winter term there was a further falling off in the experimental group, more noticeably in the girls than in the boys.
6. Immediately after the campaign, the girls claimed they were eating sweets and biscuits between meals to a slightly lesser extent than previously. This improvement was maintained.

7. Among boys the campaign against eating sweets and biscuits between meals appeared to have little effect.

Where a practical lead is given, the education authorities and individual teachers show a keen interest in imaginative oral hygiene teaching, and are anxious to include such teaching in the curriculum even when that curriculum is already heavily loaded.

A second report will analyze the results of gingival examinations of a sample of children from this investigation.



Public health dentistry

The Murry and Leonie Guggenheim Dental Clinic

Clinic report of Dec. 31, 1955. 32 p.

Mr. and Mrs. Murry Guggenheim founded The Murry and Leonie Guggenheim Dental Clinic in 1929 "to afford charitable and benevolent assistance by means of the owning, establishment and maintenance in the State of New York of one or more dispensaries or clinics for dental treatment and hygiene, and as accessory to such dispensaries or clinics (a) to maintain and carry on one or more schools for education and training in oral hygiene and preventive dentistry and pedodontics, and (b) to assist and encourage investigation and research into the problems of dental science and dental methods."

The clinic building in New York City is a modern six story building with about 38,000 square feet of floor area. On Dec. 31, 1955, dental service was provided by a combined staff of 16 attending dentists and 63 recent dental graduates, using equipment consisting of 80 dental chairs and 75 dental tridents together with the necessary dental equipment, x-ray machines and so forth. Clinical supervision was provided by 19 staff members under the general supervision of the clinic director, Daniel F. Tobin.

The basic purpose of the clinic has been to provide complete dental care, free, to public and

parochial school children, who otherwise because of the financial status of the family could not receive proper dental attention. Service is limited primarily to those children attending schools within walking distance of the clinic or within 30 minutes traveling time by bus. Once a child is registered as a patient, the clinic continues to make its services available until the child has finished junior high school, unless the financial status of the family has materially improved.

The service furnished by the clinic comprises the following: (1) examination of the teeth and oral tissues at an early age; (2) insertion of fillings in deciduous and permanent teeth; (3) the treatment of abnormal conditions and (4) the training of the child in proper care of the mouth.

Eligible children from 66 public schools, 27 parochial schools and 3 day nurseries are receiving dental service on a weekly appointment basis. In the year 1955 the clinic served 26,211 patients who made 188,250 visits to the clinic. Other operating statistics for the year 1955 include 17,182 prophylactic treatments at the clinic and 39,661 prophylactic treatments through the clinic's mobile school oral hygiene service, 191,200 permanent fillings, 15,970 extractions, 458 root canal therapy operations, 1,852 pulpotomies, 456 preventive malocclusion operations and 12,746 administrations of local anesthetics.



Hygiene and prophylaxis

Calculus

Frank G. Everett. *J.Am.D.Hygienists' A.* 30:121-125, 166 July 1956

Dental calculus is a calcified material deposited on the clinical crowns of many teeth, and on dentures and other dental appliances. Supragingival calculus is found most abundantly around the lingual surfaces of the lower anterior teeth and the buccal surfaces of the upper first molars, corresponding to the openings of Stenson's and Wharton's ducts. Supragingival calculus generally is light yellow and moderately hard. Subgingival

calculus is harder, is dark brown, and is found as an incrustation on the tooth surface within a periodontal pocket.

Calculus, as a heavily infected, calcified material lying adjacent to but outside the epithelial covering of the body, constantly irritates the mucosa.

Supragingival calculus derives its calcium salts from the saliva. Subgingival calculus may receive its lime salts from the serum of the exudate of the periodontal pocket.

Two phases of calculus formation may be distinguished—the deposition of a matrix, easily removable by brushing within 12 to 24 hours, and the subsequent, gradual calcification and hardening of this material. A significantly higher content of calcium and phosphorus is found in the saliva of patients who develop calculus rapidly than in the saliva of those who are free or nearly free of calculus deposition.

Supragingival calculus is laid down in a paroxysmal pattern. G. V. Black found that after heavy meals there was a prompt spurt of calculus deposition and that calcification was rapid; this heavy deposition lasted for several hours. After light meals no such spurts occurred. Heavy supragingival calculus deposition is noted in patients suffering from certain metabolic disturbances, such as diabetes. Calculus is rare in childhood; it might be assumed that all the calcium during this period of life is needed by the body for skeletal calcification.

Clock and Murray (1938) found calculus to be 83 per cent inorganic material. Philipp found supragingival calculus to be 75 per cent inorganic material. The inorganic components of oral calculus consist primarily of calcium and phosphorus in the form of apatites, whitlockites and brushites, and of some magnesium, carbonates and traces of other inorganic elements. In the organic portion of calculus are keratin, mucin, nucleoproteins and lipoids.

Histologic examination shows that calculus is deposited in layers.

Dental calculus can be controlled by preventing or minimizing its formation, and by removing the deposit after it is formed. Means of preventing the formation of calculus include toothbrushing and mouth rinsing to remove deposits within the first 12 hours after formation, before calcification

has hardened them sufficiently to resist the action of the brush. Moderation in eating also inhibits the formation of calculus.

Scaling and polishing at regular intervals are essential to remove deposits of calculus after they have been formed. The entire clinical crowns of the teeth should be polished to satin smoothness.



School dentistry

Dental service in the public school system of Budapest, Hungary

(A főváros iskolafogászati ellátottsága és feladatai)

Jozsef Karossa-Pfeiffer. *Fogorv.szemle* 49:33-38 Feb. 1956

At the end of 1955, 49 specialists of all dental branches were active in the dental service maintained at the public schools in Budapest. At the beginning of 1950, only 14 dentists—with no orthodontists or pedodontists—served at the school dental clinics.

The dental service in the public school system, although created to provide school children with periodic dental care, at present is directed toward prevention of caries. Preschool and school children between the ages of from 3 to 14 years today number 214,000. One dentist takes care of about 6,000 children yearly. In 1950, the average number exceeded 8,000. The present goal in Hungarian school dentistry is that one dentist should provide dental care for 4,000 children of which about 100 will need immediate treatment; the others must undergo periodic examinations at least twice a year.

Today, students attending secondary and professional schools receive only emergency care from school dentists. These students, about 60,000, must receive any necessary additional treatment at the private dental offices. In the near future, however, it is planned to include these students in the dental service of the public school system.

During the term 1953 to 1954, school dentists treated 33,264 deciduous and 120,107 permanent

teeth. Of 44,796 teeth extracted, 39,595 were deciduous and 5,201 were permanent. Each school dentist treated an average of 4,793 teeth and extracted 1,262 teeth.

In 1952, the Municipal Orthodontic Consultation and Training Institute of Budapest was created. At present, the Institute's staff consists of 11 dental specialists and 9 dental technicians. In 1955, about 3,000 child patients were treated at the Institute. Some 21 per cent of the children between 6 and 14 years old suffered from dental anomalies which required immediate orthodontic treatment.

Cooperation between school dentists and dental specialists is achieved, and great importance is given to the training of educators and parents in dental hygiene.

▼ Caries etiology and control

Protection to mother and child through the dental services

for prevention and assistance (Protección a la madre y al niño a través de los Servicios de Odontología Preventiva-asistencial)

C. G. González Domeco. *An.españ.odontoestomat.*
14:771-780 Oct. 1955

The program of protection against dental disease for the mother-child unit has been developed for those cities in which the fluoride content of the drinking water is poor and in which artificial fluoridation has not as yet been instituted. The program is already functioning in Departments 1 and 2 of the Odontologic Public Health Services in Peru. The program could be extended to the entire country through systematic and progressive education regarding dental work on the part of the departments of public assistance.

The program, as it is already working, covers the fields of (1) education of expectant mothers on dental problems, and (2) the prevention and treatment of dental diseases. The prevention of dental diseases, mainly caries, starts as soon as the woman becomes pregnant. When expectant

mothers who are seen in maternity centers and other agencies of social health assistance are in need of dental care, they are referred to the dental departments of the health service. Here a record is made of the condition of the patient's teeth and soft tissues.

Expectant mothers are taught how to improve their diet and health for the normal development of the teeth and the oral structures of the child. If the patients need dental treatment they are informed that pregnancy is not a contraindication to such treatment, which is given on the following bases:

1. Septic foci (teeth with advanced caries, roots remaining from carious teeth and periodontal diseases) are eliminated by extraction or by minor oral surgery.
2. Teeth with nonpenetrating caries are filled.
3. Diseases of the soft tissues, especially if caused by nutritional deficiencies, are treated on the basis of the cause of the disease.
4. Prophylaxis and toothbrushing are complementary to the treatment.

The oral structures of the child are carefully examined after birth and once a year thereafter for the first three years of life. The diet and the oral hygiene of the child are supervised and if dental care is necessary, it is given.

Topical treatment for the prevention of caries is begun when the child reaches the age of three. A 2 per cent sodium fluoride solution is applied to the teeth according to the classic technic by which the solution remains in contact with the teeth for five minutes. It is applied to two quadrants on one day and to the other two the following day. A total of four local treatments over each dental arch is given during one course of treatment. The entire treatment consists of two such courses, one given when the child is three years old and the other when he is seven. The second is the last treatment of the preventive program that is given to the child.

The second course of treatment is given to the child when he reaches seven years of age regardless of whether he had had the first course at the age of five or six. This method can be applied to large groups of children in need of topical fluoride treatments even if they have already received other care.

Operative dentistry and theories concerning caries

J. C. Ailianos. *Stomat., Athens* 13:1-16
Jan.-Feb. 1956

Caries was first studied by Hippocrates, later by his ancient successors, notably Galen. Fauchard's classic definition is: "Dental caries is a disease which destroys teeth." All subsequent researchers have sought to determine precisely the terms of this definition. Current theories fall into two groups, according to the factors—external or internal—which play a decisive role in the development of this disease.

Wescott, Tomes, Magitot and Miller expounded exogenous theories, according to which caries results from the action of acids produced by microorganisms and their toxins in the oral cavity. Other scientists (Black, Cruet, Frey, Kite, Shaw and Sognnaes) have defined these bacteria (*Lactobacillus acidophilus*, *streptococcus* and *staphylococcus*), what acids they produce (mainly lactic and acetic), and under what conditions (fermentation of alimentary residue deposited between the teeth, presence of mucinous plaques).

The proteolytic theory, outlined by Frisbie, tends to explain caries through the attack of enamel organic substances. Gottlieb and other writers have conciliated the two theories by accepting the decalcification of the enamel by acidogenous bacilli and the attack of the dentin by proteolytic bacteria.

B. Krasse, Sellman and Gustavsson have reported that lactobacilli are neither the cause nor the specific effect of caries, but simply one of the numerous phenomena involved in its development.

Although the number of lactobacilli may indicate the gravity of caries, this in itself is of no value. It should be considered jointly with other factors, such as salivary streptococcus or streptococcus gamma and other streptococci of the type *mitis* (*viridans*).

The exogenous theories alone do not account for the cause of the disease. They must be supplemented by the endogenous theories (Beretta, Rousseau-Decelle, Bercher, Fargin-Fayolle, Fleury, Lacaisse), admitting localization, through the circulatory system, of bacteria in the pulp

and, consequently, caries of internal origin. The author agrees with Dechaume that the trophomicrobic agents capable of causing troubles of a circulatory or endocrin sympathetic nature in the odontoblast should be envisaged.

Dental pulp infection and necrosis have been observed in instances of influenza, typhoid fever and phlebitis.

Desp all researches, the etiology of caries has not been fully established. Factors to be taken into account include defective nutrition and mastication, race, heredity and age. The occurrence of caries is conditional on exogenous, endogenous and mixed agents. As stated by Mahe, dental caries is not an autonomous disease but a complicated manifestation of an organic decline.

Prevention of "baker's caries" through chewing gum medicated with chlorophyll (Kariesprophylaxe mit Chlorophyllkaugummi bei Bäckern und Konditoren)

J. Gerke and W. Klimt. *Zahnärztl. Rundschau* 64:499-506 Oct. 5, 1955

Many reports in dental literature have emphasized that the caries frequency in bakers, candy-makers and pastry cooks is far higher than in other professional groups.

To evaluate the claims made by manufacturers in behalf of chewing gums medicated with chlorophyll as caries preventives, the staff of the Dental Institute of the Medical Academy of Düsseldorf, Germany, undertook a year long examination and observation of 102 bakers and candy-makers.

It was established that the majority of persons examined did not practice oral hygiene. The strenuous nightwork was given as an excuse.

Clinical examination of both groups revealed that 20.7 per cent of the teeth were carious, and from those, 13.8 per cent had severe lesions on the tooth necks.

For control purpose, a third group of 37 bakers and candy-makers was formed.

No difference in caries frequency was observable between Group 1 (bakers) and Group 2 (candy-makers).

After one year, the caries frequency in the control group had increased almost 100 per cent. In both test groups, however, no significant increase occurred.

Although the appearance of severe carious lesions on tooth necks increased in about 50 per cent of the control group, the caries index of similar lesions in the test groups was only 30 per cent higher.

The results of the tests seem to indicate that chewing gum containing chlorophyll can be utilized as a preliminary preventive measure in instances of "baker's caries." Further examination will establish whether sugar-free chewing gum (medicated with chlorophyll) could or should be used in the prevention of dental caries.

Some of the influences of diet on dental morbidity (part two)

Bernard Cooke. *D.Delineator* 7:8-13 Spring 1956

Dental disease is a measure of the disharmony in nature brought about by man's mismanagement. The consumption of a diet containing a high percentage of refined devitalized carbohydrates leaves a debris on the teeth which provides an easily absorbable supply of energy food for the microbial population of the mouth provided other essential food factors are available for its utilization. Such factors being virtually absent from the debris, the microbes are forced to compete with the individual for the integrity of his dental tissues—a competition which results in the dissolution of teeth and gingiva.

Lack of efficient mastication reduces the flow of the oral secretions and interferes with natural oral hygiene. As the secretions are short of the maximum inherited characters for the health of the individual, because of deficient diet, the individual's powers of resistance to microbial invasion of the dental tissues are reduced.

All that is necessary to minimize destruction of the teeth and gingiva is to provide the oral microbes with a nutrient medium more easily assimilated by them than are the patient's tissues. This is done naturally in primitive races by the consumption of natural unrefined food free from

chemical preservatives and in a physical state ensuring adequate mastication. The unpolluted atmosphere in which primitive people live assures adequate exposure of the skin to sunlight.

Until public health authorities eradicate the perversities of the civilized environment, and until better dietetic habits become the rule, the destruction of dental tissue could be minimized by more effective oral hygiene and by the provision of a "nutrient medium" in the form of a tablet, mouthwash or toothpaste which should be used immediately after meals. Such a medium would most likely be composed of urea, amino acids, fats, inorganic salts and vitamins, with other factors found by experiment to facilitate the rapid use of the carbohydrate debris by the microorganisms without their having to invade the dental tissues.

Such a treatment would introduce factors into the oral cavity that are absent from the refined, chemically treated, cooked, devitalized modern food. A largely uncooked diet provides the normal scavenging microbial population of the oral cavity with all it needs for its full metabolism and the incidental exhaustion of the carbohydrate debris without the necessity for invading the dental tissues to gain this end.

The toothbrush should be regarded as an instrument for applying water to the teeth so that as they are washed the water may run out of the mouth, taking the debris with it. A toothbrush with a hollow handle which could be attached by rubber tubing to the water tap, so that a continuous stream of water could be directed to all surfaces of the teeth, to dislodge the debris and remove it from the mouth, is proposed.

The caries problem in Ljubljana, Yugoslavia (Problematika kariesi v Ljubljanski kotlini)

Valter Kruščić. *Zobozdrav.vest.* 11:4-20
Jan.-Feb. 1956

A committee, appointed by the Yugoslavian government, recently presented recommendations on the aspects of clinical studies of caries incidence in Yugoslavia, as follows: selection of the caries index type, standardization of dental examination, terminology, methods for control of variables,

utilization of laboratory tests for clinical studies and statistics, investigation procedures, analysis of data, evaluation of conclusions and results, and principles of publication.

The completed investigation of the caries problem in Ljubljana and its basin, a geographic unit with a population of about 200,000, should serve as an example for future Yugoslavian caries research.

In this investigation, the clinical examination of children, the determination of caries frequency and intensity, the varying economic circumstances, nutrition, and geographic and climatic conditions were considered.

During the investigation, 30,000 teeth of 1,197 children (51 per cent boys and 49 per cent girls) were examined. The children were divided into two age groups: Group 1 from 6 to 9 years old, Group 2 from 9 to 15.

Although the main object was the determination of caries incidence in school children, the data obtained also revealed other phenomena such as the eruption of completely developed second molars before children reached the age of nine years, and the deviations from normal in the period of changing dentition and in permanent dentition. At the age of seven, the deciduous teeth prevailed. A balance between deciduous and permanent teeth was observed at the age of eight and a half years. The exfoliation of deciduous teeth and the eruption of permanent teeth is subjected to the natural law of tooth development and growth, and can be measured by comparison with the gaussian curve. The shedding of deciduous teeth follows the right part of the curve, and the eruption of permanent teeth that of the extreme left part. Further examinations may reveal that this is a significant characteristic of tooth development and eruption.

No essential difference in caries incidence was observable in relation to the sex of the children examined. Caries frequency gradually decreased from about 8 per cent in Group 1 to about 3 per cent in Group 2. Such a decrease can be explained by the completed eruption of the permanent dentition.

Of the 1,197 children examined, 117 (14 per cent) were free of carious lesions.

Caries of deciduous teeth decreased slightly during the period of changing dentition but in-

creased gradually after eruption of permanent teeth.

Proximal caries was present in 45 per cent of the teeth examined.

By the use of a dentofacial index, it was possible to study the relation of malocclusion to caries. Children residing in a natural fluorine region not only had a lower caries frequency but also about 30 per cent fewer malocclusions than children living in fluorine-free regions.

In regard to nutritional influences on caries development, the role of rapidly fermenting sugar or sugar products appeared to be more important than that of starches.

Although the report on the caries problem in Ljubljana and its basin may be incomplete in many aspects, and perhaps even slightly erroneous in others, the suggestions and ideas presented in the recommendations to the Yugoslavian government may stimulate further caries research in other Yugoslavian districts.

Rampant caries caused by electric radiation
(Caries "rampant" causada por radiación eléctrica)

Victor M. Vera and Victor Raul Vera Vierci.
Rev. odont., Asunción, Paraguay 2:13-15
Oct. 1955-Jan. 1956

A man, working on high tension cables, suffered a 6,000 volt shock. Some time after the accident he noticed the appearance of a considerable number of cervical cavities on his teeth. On some teeth the cavities were on the lingual as well as the buccal surfaces; thus they surrounded the entire crown and produced its amputation. Until the time of the accident, dental health had been good, with only occasional superficial cavities.

The gingiva was found to be healthy. Cavities were extensive and numerous, on all upper and lower teeth. Drilling produced little pain, and neither enamel nor dentin offered much resistance to the bur.

H. B. G. Robinson has written about qualitative and quantitative alterations of saliva caused by roentgen therapy, with dental caries as a result. The present instance is reported as a contribution to the study of dental caries produced by such external agents as electric radiation.

The speed of development of the carious cavity

Gilbert J. Parfitt. *Brit.D.J.* 100:204-207

April 17, 1956

The length of time a cavity takes to develop is of interest both in clinical practice and in research. It is important to know how often clinical examinations should be made in order to avoid serious damage by caries and how long an experiment must continue to ensure that the observations show an alteration in the number of new cavities appearing over a certain period of time and not merely an alteration in the rate of their formation. In England when children are examined annually and prompt treatment is given, few teeth need to be extracted because of advanced caries, and it is generally and correctly presumed that it takes an average of over 12 months for a cavity to progress from the earliest stages to a clinical cavity.

In the present investigation, data were used from a five year longitudinal survey of 136 institutional children whose DMF rate was about 0.75 teeth a year, which is only a little lower than the DMF rate of the average London school child. Each child was examined every six months. The investigation was limited to the occlusal surfaces of the teeth where physical examination is most accurate.

Of the 1,011 occlusal cavities charted, 713 occurred in regions previously recorded as caries-free, their entire period of formation falling within the period of the investigation. Most of these cavities were found to pass through the stage of incipient caries, but in 34 instances progress was so rapid that the stage of incipient caries was not seen; 298 of the occlusal cavities were charted as incipient caries from the first examination.

Caries on the occlusal surfaces of the teeth takes from less than 3 months to over 48 months to progress through the stage of incipient caries. Up to 28 per cent are less than 6 months, and between 9 per cent and 47 per cent are less than 12 months in this stage. When yearly examinations are made, therefore, only a small number of teeth should be lost through advanced occlusal surface caries.

No seasonal variation in the incidence of dental caries was detected.

Statistical research

Statistics on fractures of the jaws recorded at the Dental Clinic of the University of Munich from 1945 to 1953

(Statistische Untersuchungen an Hand des Kieferbruch-Krankengutes der Klinik für Zahn-, Mund- und Kieferkrankheiten der Universität München aus den Jahren 1945 bis 1953)

Werner Reither. *Deut.zahnärztl.Zschr.*
11:384-391 April 1, 1956

Changes in the sociologic structure of Germany often are revealed by statistics on diseases, and, as in this instance, by an evaluation of the case histories of fractures of the jaws, recently compiled at the Dental Clinic of the University of Munich.

The increase in the percentage of complicated and multiple fractures of the jaws is remarkable. Although traumatic accidents caused by blows are still in the majority (36 per cent), fractures caused by traffic accidents (34 per cent) approach this figure. During the period of record (from 1945 to 1953), 458 patients with jaw fractures were treated at the clinic; 85 per cent were men and only 15 per cent were women. It was necessary to admit 17 per cent of the men and 3 per cent of the women to the hospital.

Although the incidence of fractures of the jaws increased in all age groups, persons between the ages of 30 and 40 were most frequently involved.

Twenty-two per cent of the fractures were in the region of the mandibular molars, 17.7 per cent in the region of the bicuspids and 17.6 per cent in the region of the incisors. Fractures of the mandibular symphysis, previously rare, were present in 3.2 per cent. Three isolated fractures of the symphysis were caused by blows, three similar fractures resulted from bicycle accidents, four from car accidents and four from unknown causes.

Future investigation will be directed toward establishing the reasons for such an increase in fractures of the jaws.

Doctoral and Masters' dissertations

In this column each month are listed recent Doctoral and Masters' dissertations of dental interest, accepted by the dental schools or graduate schools in partial fulfillment for advanced degrees. Copies of many of these theses are available from the schools through interlibrary loan.

Maxillary anatomy in relation to complete denture construction. *Clifton Dean Adams*. 1956. M.S. *State University of Iowa*.

Correlation between strength of amalgam and the method of mixing and condensing tested in two differently constructed Class II cavities. *Arne J. Bjorndal*. 1956. M.S. *State University of Iowa*.

Mandibular wax impression technique. *Harold Edward Clough*. 1956. M.S. *State University of Iowa*.

The effect of occlusion on masticatory performance. *Paul T. Fleming*. 1956. M.S. *State University of Iowa*.

A histological study in repositioning the attached gingiva. *Jon C. Grant*. 1956. M.S. *State University of Iowa*.

Mandibular anatomy in relation to complete denture construction. *Charles C. Jaslow*. 1956. M.S. *State University of Iowa*.

A study of the asymmetries of the maxillary dental arch in relation to raphe palatinus and the mid-sagittal plane of the upper facial skeleton. *Mario Truque*. 1956. M.S. *University of Michigan*.

A study of the morphology of the nasal capsular region. *William Crawford French*. 1956. M.S. *University of Michigan*.

A study of the terminal nerve endings in the periodontal membrane and gingiva. *Lewis Gach*. 1956. M.S. *University of Michigan*.

A cephalometric study of the positional relationship of the maxillary and mandibular incisors in children having excellent occlusion. *Sherwood E. Gatti*. 1956. M.S. *University of Washington*.

A study of facial patterns of individuals with Class III malocclusions. *John G. Raynes*. 1956. M.S. *University of Washington*.

Thumbsucking: A review and an analysis of a method of treatment. *Robert E. Washbon*. 1956. M.S. *University of Washington*.

The carbohydrates and proteins of human saliva. *Jane Reid Patton*. 1956. PH.D. *University of Alabama*.

The use of epinephrine in connection with local anesthesia in dental procedures. *Thakerng Prasertsuntarasai*. 1956. M.S. *University of Alabama*.

Succinylcholine as an adjunct to general anesthesia in a general office. *Robert S. Locke*. 1956. M.S. *University of Pittsburgh*.

The glenoid fossa in the evaluation of facial asymmetry. *Walter F. Hampe*. 1956. M.S. *University of Pittsburgh*.

The effect of tranquilizing agents on the ACTH response to stress. *Herbert Wells*. 1956. D.M.D. *Harvard University*.

The progress of dental caries beneath orthodontic bands: A clinical study. *Galen Warren Quinn*. 1955. M.S. *University of Tennessee*.

The intraoral pressure exerted on the maxillary and mandibular central incisors by the tongue and lips in Angle Class II, Division 1 cases. *Huey Mark Stevens*. 1955. M.S. *University of Tennessee*.

Growth differences of depleted rats fed processed and unprocessed cow's milk. *Abraham Swerdlow*. 1955. M.S. *University of Southern California*.

Orthodontic aspects of speech and speech defects. *Gerald Lee Vale*. 1955. M.D.S. *University of Southern California*.

Physiologic effects of calcium and of calcium hydroxide "Calxyl" (Die physiologischen Wirkungen des Calciums im allgemeinen und die des Calciumhydroxyds "Calxyl" im besonderen). *Karl Radermacher*. 1953. DR.MED.DENT. *University of Bonn, Germany*.

The influence of food intake, thumbsucking and breathing habits in the first months of life on the teeth (Der Einfluss der Nahrungsaufnahme, von Lutschgewohnheiten und Atmung in den ersten Lebensmonaten auf die Bisslage). *Lothar Schulte*. 1953. DR.MED.DENT. *University of Bonn, Germany*.

Root canal treatment with antibiotics: a critical observation (Wurzelbehandlung durch antibiotische Mittel: Kritische Betrachtungen). *E. Stöcklin*. 1955. DR.MED.DENT. *West German Orthodontic Clinic, Medical Academy of Düsseldorf, Germany*.

Metal fillings in instances of secondary marginal caries: a critical observation (Kritische Stellungnahme zum Problem der sekundären Randkaries an Metallfüllungen). *H. Goedecke*. 1955. DR.MED.DENT. *West German Orthodontic Clinic, Medical Academy of Düsseldorf, Germany*.

Conservative treatment methods in marginal periodontal disease (Die konservativen Behandlungsmethoden der marginalen Parodontopathien). *B. Luers*. 1955. DR.MED.DENT. *West German Orthodontic Clinic, Medical Academy of Düsseldorf, Germany*.

Determination of hardness of amalgam: Bergendahl's vibrator (Härteprüfungen an Amalgamen: Vibrator nach Bergendahl). *R. Bober*. 1955. DR.MED.DENT. *West German Orthodontic Clinic, Medical Academy of Düsseldorf, Germany*.

Relations between periodontal disease and disturbances in stomach and duodenum (Über die Beziehungen zwischen den Parodontopathien und den Erkrankungen des Magens und des Duodenums). *K. Gehlhaus*. 1956. DR.MED.DENT. *West German Orthodontic Clinic, Medical Academy of Düsseldorf, Germany*.

Caries prevention and daily oral hygiene (Kariesprophylaxe, von der täglichen Mundpflege aus gesehen). *K. Nietzsch*. 1956. DR.MED.DENT. *West German Orthodontic Clinic, Medical Academy of Düsseldorf, Germany*.

The influence of ultrasonics on pulp and tooth development in rats (Einfluss des Ultraschalles auf Wachstum und Pulpä des Rattenzahns). *Hans Joachim Hegerl*. 1953. DR.MED.DENT. *University of Mainz, Germany*.

Critical observations on a series of modern methods for enlarging root canals (Kritische Betrachtungen einer Reihe moderner Wurzelkanalweiterer). *Gerhard Bartling*. 1954. DR.MED.DENT. *University of Mainz, Germany*.

Experiments on nutrition and caries (Experimentelle Untersuchungen über Ernährung und Karies). *Felix Schäfer*. 1953. DR.MED.DENT. *University of Mainz, Germany*.

The effect of proteolytic enzymes on inflammatory processes in the mucous membrane and the gingiva (Über die Wirkungsweise protelytischer Enzyme bei entzündlichen Prozessen der Mundschleimhaut und des Zahnfleisches). *Engelbert Fasbender*. 1953. DR.MED.DENT. *University of Mainz, Germany*.

Experimental studies on changes in tooth surfaces after topical fluorine application (Experimentelle Untersuchungen über die Veränderungen an Zahnoberflächen nach peroralen Fluorgaben). *Dietrich Lohse*. 1955. DR.MED.DENT. *University of Tübingen, Germany*.

Methyl chloride poisoning, an occupational disease (Die Methylchloridvergiftung als Berufskrankheit). *Helmut Breisch*. 1955. DR.MED.DENT. *University of Tübingen, Germany*.

Bactericidal effects of "Reogan" and copper "Reogan" on enterococci (Über die bakterizide Wirkung von Reogan und Kupferreogan unter besonderer Berücksichtigung der Enterokokken). *Elsa Teizeira*. 1955. DR.MED.DENT. *University of Tübingen, Germany*.

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